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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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"A Little Learning"

THE questions which certain Labour members continue to address to the Government about what they call "fixated nitrogen" illustrate once more the dangers of "a little learning" and the need for enlightenment which they disclose is far deeper than the questioners themselves realise. On the other side, Sir L. Worthington-Evans, who has replied on behalf of the Government, seems nearly as much at sea on the subject. The tone of his replies has tended to suggest mysteries, where a clear and simple statement of the position should have effectually pricked the bubble. One can think of at least two members on the same side of the House who could have enlightened the critics in a way that would have made them look very small indeed.

The general position as regards Billingham has been familiar to all engaged in chemical industry for some years past, yet when it was announced in the House that these so-called "works" were sold five years ago to Brunner, Mond and Co., the questioners hailed the news as if they had unearthed another tomb of the Egyptian Kings. The "factory," as was stated, was extensively advertised before the sale, and it was a piece of genuine public enterprise—very largely in the national interest—when Brunner, Mond and Co. took the place over. The Government would have been fortunate indeed if they could have got Gretna taken off their hands in the same way. Of these facts—commonplaces of chemical knowledge—the Labour members seem never to have heard. Equally hazy are their ideas about the sale of the "secret documents," and results of research. They appear to think that the Government disposed of a simple recipe and plant for the production of synthetic ammonia, very much as some quack might have disposed of a prescription for a patent medicine, and that all the purchasers had to do was to pull the lever and set the wonderful "works" in motion. The truth is, that Brunner, Mond and Co., in the thorough way one would expect, have had to develop their own process on the basis of the experience already available, and to design and construct their own plant, the most troublesome part of the whole problem. It has been a costly and arduous task, and their success with it is an honour to British chemistry and engineering, and an asset of almost incalculable value to the State. If such questions as those put by the critics in this case really represent Labour thought respecting the development of scientific industries, they will go far to destroy, among the intelligent classes, even a theoretical sympathy with the idea of nationalisation.

Sunday "Shut-downs"

WHERE extra time has to be paid for process work on Sundays in chemical works, the mangement must often have considered the question whether it is desirable temporarily to suspend a continuous process during such hours when extra pay is granted, or more profitable in the long run to continue the operation of the plant uninterruptedly. There are many considerations involved. The principal item of cost is not necessarily the extra process wages but the effects of a temporary suspension in the loss of heat, and the consequences which ensue—the amount of extra power or energy which has to be applied in order to get the plant functioning normally again, and the failure to secure the usual working efficiency during the first few hours following the re-start—are factors of vital importance.

This subject is suggested by a perusal of a paper by Mr. G. E. Currier, on "Notes Concerning Gasworks Practice," in which the aspect of Sunday work is discussed in some detail. Mr. Currier expresses the view that where special circumstances permit the better policy is to continue operation during Sundays. Ex-

perience of many continuous processes involving the manufacture of heavy chemicals certainly tends to support this opinion. In many cases the normal operation has been dislocated by an attempt to economise on a single item of cost at what has proved to be the expense of a number of other items, which in the aggregate have been of greater material importance than the one on which it was falsely imagined that an economy could be effected. The fuel costs of one or two processes have been known to increase by 4 or 5 per cent. as the result of an effort to reduce Sunday work, paid at an extra rate.

Apart from the foregoing aspect, there is another question which certainly merits ventilation. Is it more economical to stop a continuous process on a Sunday, and to effect the necessary minor repairs, which must inevitably arise from time to time even in the best managed works, or should this kind of work be effected during one of the days of the week, when normal rates apply to the repair work concerned? We do not imagine that there will be any unanimity of opinion on this question, but an expression of opinion would certainly be interesting from those who are intimately acquainted with this aspect of chemical works management.

Recovering Pre-war Trade Standards

THE frequency with which, month by month, the past year showed increased national imports of goods and raw materials as compared with the corresponding periods of the preceding twelve months, coupled with the relative falling-off of export trade, induced a feeling of pessimism in some circles, which is now shown to have been quite unfounded. A mountain of trade debts was apparently rising against us and there seemed little hope of regaining foreign exchange parity. In the result, the import movement into Great Britain for the whole of 1924 reached a record total of £1,280,000,000 and exceeded the exports by no less than £345,000,000. This unfavourable balance of trade has now, however, been placed in its true perspective by an official comparison of post-war foreign trade upon the currency basis of the year 1913, and also by the issue of additional statistics relating to services performed in one way and another by this country in 1924, which do not enter into consideration during the compilation of the monthly imports and exports.

Taking this second group of facts, the adverse balance of commodities referred to was entirely eliminated by the so-called "invisible exports," including such items as shipping services valued at £130,000,000, net income from overseas investments of £185,000,000, and financial services estimated at £40,000,000, until the final balance of debt has become £29,000,000 in our favour. The deficiency is thus shown to be non-existent, but there still remains a point to be noted. This surplus of national receipts over expenditure has dwindled consistently during the past three years and is now only one-sixth of the figure recorded for the year 1913. Concurrently with this there has been an improvement in exports and therefore much reason for the decline must be assigned to increasing imports. The situation calls for careful consideration and one remedy lies along the path of growing export trade.

Fortunately, in this connection, there is ground for anticipation of satisfactory developments. Comparing the last few years upon the basis of the common denominator of 1913 money values, the real volume of exports has grown from £362,000,000 in 1922 to £404,000,000 in 1923 and to £420,000,000 in the past twelve months. The latest figures show, in fact, that our export trade as a whole is now back to 80 per cent. of its best pre-war volume.

Throughout the chemical industry the 1924 ratio shows a slight advance upon that of the previous twelve months and has now reached 62 per cent. The movement is gradual and heading in the right direction, but much more effort is still needed to bring our overseas trade up to the pre-war level.

The Taxation of Industry

IT is to be hoped that the influential deputation of business men which waited upon the Chancellor of the Exchequer on Tuesday to bring home to him the heavy burdens under which industry is at present struggling made some real impression on Mr. Churchill's mind. Two reliefs would be especially appreciated at the present time. The first is some relief to taxpayers, great and small, who find a large proportion of the income they have struggled to secure, and badly need, seized to maintain our costly government machinery. The other is a return to penny postage, which would undoubtedly enormously increase postage business and which, instead of reducing revenue, might easily have the opposite effect owing to increased business. Up to now Mr. Churchill has given in reply nothing more than an expression of sympathy with the sorrows of those for whom the deputation spoke, and until a definite reply is furnished we must exist on hope.

Unfortunately, although business men have been building on favourable Budget Day revelations, the new Estimates of expenditure, compared with those of a year ago, offer little more comfort than a hungry man might expect to draw from a yesterday's menu. When Mr. Baldwin wittily discoursed to a large and delighted company of Civil servants, on the occasion of their annual dinner, he spoke at least one true word in jest, viz., his reference to the ease with which Estimates might be trimmed down for Budget purposes and readjusted later on by means of a Supplementary Vote. That is precisely what may happen now. The truth is that unless Mr. Churchill is reserving a welcome surprise for Budget Day, or something happens in the Commons to change the complexion of things, the national balance-sheet will be anything but a cheering document, in spite of "closer budgeting" and supposed saving in one direction and another. There appears to have been not the slightest effort to bring about what the country urgently needs, a drastic cutting down of expenditure in order to relieve, to some small extent, the crushing burden so long borne by industry and commerce. This is not a question into which the party spirit enters. The business men who are suffering most belong to all parties. If those who

control affairs can see no possible way in which to prevent British taxpayers remaining the financial weight carriers for half a dozen foreign countries, it is at least their duty to discover some means of reducing the burden being borne on home account, and if the coming Budget makes no provision of that kind it will cause profound dissatisfaction.

The Makonine Fuel Process

A GOOD deal of quiet enthusiasm has lately been displayed in France in connection with the investigations which the army authorities have been undertaking with the plant which the Russian engineer Makonine has invented for the production of motor fuels from crude oils of both vegetable and mineral origin. So far as can be gathered the trials, which were conducted at Vincennes, seem to have fully established the claims of the inventor, and it was anticipated that road and even rail traction might be altogether revolutionised, particularly as France has to rely so largely on imported oil fuels. Some secrecy seemed to be preserved as to the precise *rationale* of the process, but just recently the patent specification has been published, and, if it represents a complete statement of the case, there would appear to be nothing particularly revolutionary in M. Makonine's ideas.

The plant embodies apparatus for the distillation of crude oils, followed by condensing arrangements for dealing with the vapours prior to their admission to the engine, although it is stated that, if preferred, the products of distillation may be used direct as a vapour in the engine. Vaporisation is apparently carried out by the heat of the engine exhaust, but the great drawback to the whole system would seem to be the necessity for carrying about a comparatively unwieldy plant which, presumably, must be augmented with the necessary receptacles for collecting those residuals which would not lend themselves to combustion. It is always possible, of course, that the inventor may be keeping something in the background which is not disclosed in his specification, but as the process stands it would appear to be of utility only in the case of the heaviest vehicles and to present no particular advantage from the technical and economic standpoints over those systems of traction which make use of a producer gas generator and a solid fuel.

Oil and Colour Monographs

DR. R. S. MORRELL is editing for Ernest Benn, Ltd., a new series of monographs on the different branches of Oil and Colour Chemistry. His aim throughout has been to secure as authors for the different volumes specialists who combine wide factory experience with a knowledge of the most recent scientific developments. Among the first volumes to be published will be "Cellulose Varnishes," by F. Sproxton, B.Sc.; "Blacks and Pitches," by H. M. Langton; "The Chemistry of Drying Oils," by R. S. Morrell, M.A., Ph.D., F.I.C., and H. R. Wood; and "The Analysis of Pigments. Paints and Varnishes," by J. J. Fox, F.I.C., and T. H. Bowles, F.I.C. A critical digest of the published literature will be a feature of the series, which will also deal carefully with manufacturing processes.

Points from Our News Pages

An article describes in detail a Knowles electrolytic plant for supplying hydrogen to a Claude synthetic ammonia plant at Bussi (p. 244).

The subject of "Expansion and Compression Phenomena in Steam Jets" is dealt with in a paper by Professor Mellanby (p. 245).

The Chemical Constitution of Azo Dyestuffs is the subject of a paper by Dr. Schedler (p. 247).

Letters are published on "Oil Shales" (The Fusion Corporation, Ltd.), and "Synthetic Resins" (A. A. Drummond) (p. 247).

A visit to the works of the Clayton Aniline Co. by members of the Manchester and Liverpool sections of the Society of Chemical Industry is described (p. 248).

Sir Max Muspratt spoke on "Chemistry and Civilisation" at the joint meeting of the Society of Chemical Industry and the Institute of Chemistry in London (p. 249).

In Parliament this week, questions of considerable importance have been raised, including dyestuffs and nitrogen fixation (p. 252).

Our London market report shows a little more activity, although business is still only quietly steady (p. 258).

Our Scottish market report reveals a fairly steady state, but the volume of trade is disappointing (p. 261).

The death is announced of: Sir T. R. Ratcliffe-Ellis, Messrs. C. Hanson, J. J. Rainey, J. Thomas, R. Brown, W. Gibson and C. H. Leigh (p. 263).

The Calendar

1925 Mar.		
14 & 21	Royal Institution of Great Britain: "The Counting of the Atoms." Sir Ernest Rutherford. 3 p.m.	21, Albemarle Street, London, W.1.
16	University of Birmingham Chemical Society: "The Meaning of Van der Waal's Equation and the Critical Temperature." Professor J. S. Haldane. 5.30 p.m.	Chemical Lecture Theatre, Edgbaston.
17	Sir John Cass Metallurgical Society: Annual General Meeting and President's Address.	London.
17	Royal Photographic Society: "Some Modern Views on the Sensitivity of Emulsions." Dr. T. Slater Price. 7.30 p.m.	35, Russell Square, London, W.C.1.
17	Mineralogical Society: Papers by S. Tomkeieff, E. D. Mountain and Dr. A. Brammall. 5.30 p.m.	London.
17	Hull Chemical and Engineering Society: "Some Aspects of Low Temperature Carbonisation." N. Simkin. 7.45 p.m.	Grey Street, Park Street, Hull.
17	Society of Chemical Industry (Birmingham and Midland Section): "Some Recent Work on Gaseous Explosions," H.T.Tizard. 7.30 p.m.	White Horse Hotel, Birmingham.
17	Society of Dyers and Colourists (Leeds Junior Branch): Annual General Meeting. Paper by Professor A. G. Perkin.	Leeds.
18	Society of Glass Technology. 2.30 p.m.	Armstrong College, Newcastle-on-Tyne.
19	Chemical Society: "The Activation of Graphite as a Sorbent of Oxygen." D. H. Bangham and J. Stafford. 8 p.m.	Burlington House, Piccadilly, London.
19	Society of Chemical Industry (Manchester Section). Joint Meeting with the Institution of the Rubber Industry: "The Joule Effect." R. W. Lunn.	Textile Institute, Manchester.
20	Royal Institution of Great Britain: "Soaps and the Theory of Colloids." Professor J. W. McBain.	21, Albemarle Street, London.
20	Society of Dyers and Colourists (Manchester Section): "A New Reaction with certain Diazo Sulphonates derived from β-Naphthol-l-Sulphonic Acid." Dr. F. M. Rowe, A. C. Burns, J. S. H. Davies, and Miss E. Levin.	36, George Street, Manchester.

Hydrogen for Synthetic Ammonia Production

Electrolytic Plant for Italian Works

At the present time, when a number of synthetic ammonia plants have recently been put in commission in various parts of the world, and a still greater number are under consideration, the following description of a Knowles electrolytic plant for the supply of hydrogen to a Claude synthetic ammonia works will be of interest. The plant has just been installed by the International Electrolytic Plant Co., Ltd., Chester, at the Bussi works of the Societa Italiana di Elettrochimica.

For all hydrogenation processes, it is acknowledged that pure electrolytic hydrogen is far superior to hydrogen produced by other processes on account of its entire freedom from catalyst poisons, ensuring a very high efficiency in the reaction

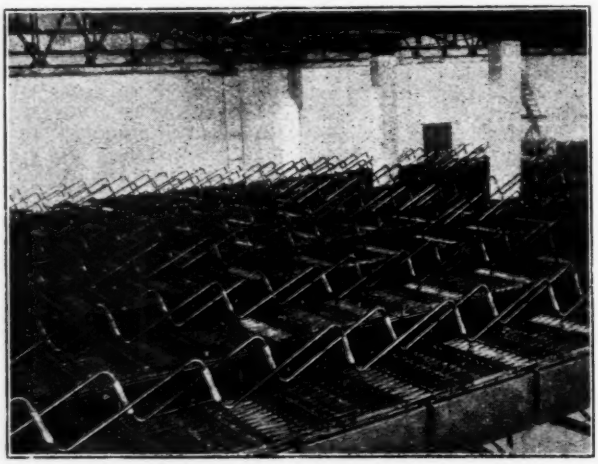

Fig. 1

vessels. Another and most important advantage offered by the electrolytic process, is the great flexibility of the cells in operation, which enables them to be run from off-peak power by instantly varying the current passing through them to suit other fluctuating demands on the same generation station. It is thus quite possible to instal a battery so that the station load factor is practically 100 per cent., and so obtain power for the plant at little or no cost. Since the cost of electricity is usually by far the largest item in the running costs of an electrolytic plant, a battery operated by surplus power will produce hydrogen at a lower overall cost than is possible by any other method. Further, the oxygen by-product is very readily saleable when the plant is installed in or near an industrial area, and in some cases the revenue from this source shows a profit over the whole cost of operating the plant.

Although there was no sale for oxygen at Bussi prior to the installation just completed, power varying throughout the 24 hours of the day from 750 to 3,000 Kw. has been available, but not utilised since the war, owing to lack of the raw material for aluminium, to produce which hydro-electric stations were constructed and heavy current converting sets installed. These power stations supply current for a variety of chemical processes carried on at Bussi, but the amount of surplus power depends chiefly upon the demand from Naples, which derives part of its electrical supply from the same network.

No capital outlay on generating plant was involved, and, in deciding upon the size of cell to be used, it was therefore possible entirely to neglect the cost of power and instal cells operating at low efficiency, but at maximum output, thereby keeping the capital outlay down to a minimum. It will, of course, be understood that as the surplus power decreases, the current passing through the cells also falls, causing their efficiency to rise, and there are thus periods when the plant is actually operating at high efficiency.

Usually, the cost of upkeep increases rapidly if cells are run up to their maximum capacity, but this has been specially guarded against in the Bussi plant by suitably proportioning the current leads and other parts of the cells likely to deteriorate, on account of the very heavy currents they have to carry during periods of maximum power, which may be of eight hours' duration.

Plant and Production

The plant consists of 160 cells arranged in four batteries of 40 cells, each guaranteed to carry a current of 7,200 ampères at 2·6 volts per cell. This grouping was adopted to suit five existing motor generator sets, each capable of giving 7,200 ampères at 105 volts. The total maximum output of the plant is therefore 528 cubic metres of hydrogen per hour, equivalent to an efficiency of 5·66 Kwh. per cubic metre. On test, after the batteries had attained constant working temperature, the voltage was actually 2·4 volts per cell, equal to an efficiency over 7 per cent. higher than the guarantee.

The hydrogen direct from the cells was guaranteed to be 99·5 per cent. purity, and the oxygen 99·0 per cent., while the actual figures obtained were hydrogen 99·99/100 per cent., and oxygen 99·6/99·8 per cent. purity. Each battery of 40 cells is arranged in two banks of 20 cells, and can be run independently from any one of the five motor generator sets, or the four batteries may be coupled to the same busbars and run from the five sets operating in parallel. Since the efficiency of the cells increases as the current passing through them falls, the maximum output of gas from a given number of Kw. is obtained by distributing the load over all four batteries. It is, therefore, the usual practice at Bussi to keep the four batteries running continuously, but as the power increases or decreases, to vary the number of motor generators, so that they are working at maximum efficiency. Part of the cell room is shown in Fig. 1, and the special S-shaped offtake pipes for separating electrolyte spray from the gases are clearly visible running along the banks of cells.

Automatic Feed Water Tanks

A good view of these feed tanks is given by Fig. 2, from which it will be seen that there is one set of three tanks to each row of cells. This equipment, which is a patented feature of the Knowles plants, automatically maintains the level of the electrolyte constant, irrespective of the current passing through the cells, and also washes the gases before they pass to the bus mains running across the cell-room. The distilled water is distributed equally between the outer tanks by a special valve over the centre tank, into which it overflows from the outer tanks and then runs by gravity

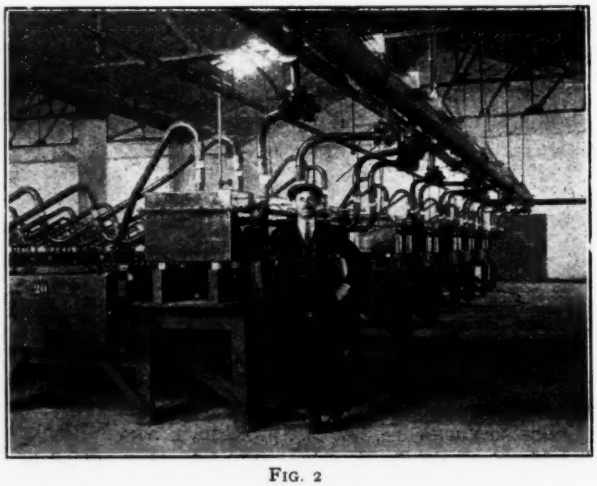

Fig. 2

along the feed water pipes to the cells. The valve opening is controlled by a float in the centre tank, and can easily be adjusted to give any desired height of electrolyte in the cells. The S-shaped offtake pipes running over the banks of cells terminate in the outer tanks (one for each gas) and any electrolyte not separated from the gases in these

pipes, is washed out in the tanks and returned with the distilled feed water to the cells.

The quantity of caustic soda required for maintaining the electrolyte at its proper density is therefore exceedingly small. Three-way cocks are fitted in the gas pipes from the washer tanks to the bus mains, so that when the plant is started up, the gases from each bank of cells can be blown to atmosphere to ensure that only high purity gases are turned to the mains.

Distilling and Auxiliary Plant

Distilled water for the cells, of which about 135 gallons are required per hour, is produced by the Wirth compressor system. This system was chosen since the cost of electricity is negligible at Bussi, and the makers were prepared to guarantee the required amount of absolutely pure distilled water, using only 40 Kgs., of steam per hour at 30 lbs. per sq. inch., and a 25 h.p. driving motor for the vapour compressor. With the ordinary type of distilling plant, fed with steam produced by a coal fired boiler, about 85 Kgs. of coal per hour would be consumed, and, as coal is very expensive at Bussi, a very large saving is effected by utilising the Wirth compressor system. The plant has easily exceeded its guarantees, and the purity of the water leaves nothing to be desired. A careful check on the purity of the water is kept by means of an electrical indicator, which shows at once the slightest trace of impurity in it. Multiple arm pressure gauges indicate the pressure at various points throughout the plant, so that the attendant in charge can see immediately whether any undue pressure is occurring on any part of the system.

The hydrogen is drawn from the mains by a positive type booster equipped with governing gasholder gear to ensure that under no circumstances can the pressure on the cells fall to less than 1 in. water gauge. From the booster, the gas is delivered at 10 in. water gauge into a long pipeline running to a gasholder, from which it is drawn by a compressor for use in the synthetic ammonia reaction vessels.

Expansion and Compression Phenomena in Steam Jets

Professor Mellanby's Paper Before Chemical Engineers.

The subject for discussion at a meeting of the Institution of Chemical Engineers in London on Wednesday was "Expansion and Compression Phenomena in Steam Jets," which was introduced in a paper by Professor A. L. Mellanby, D.Sc.

At the outset Professor Mellanby explained that his object was to give an account of some simple experimental methods whereby the losses attending the flow of steam in elementary nozzles could be readily and accurately determined, and to show especially the relation between efficiency and pressure drop, or between efficiency and exit velocity.

Napier's Investigations

Careful investigation of the flow of steam through an orifice, from a region of high to one of low pressure, appeared to have been first made by Napier in 1867. The experiments indicated that the quantity of steam passing through an orifice was a maximum when the back pressure was equal to about half the initial pressure. Any further reduction of the back pressure was found to have no effect upon the amount of steam discharged. At that time the laws of the pressure drop along the jet were not known, and Napier's results were considered to be opposed to the theories then prevalent. The explanation of the experimental facts was not forthcoming until 1886, when Osborne Reynolds pointed out that, in a nozzle of varying section, the maximum velocity at the minimum section was equal to the velocity of sound in the flowing medium. From this it followed that, for a gas passing through a simple orifice into a region of lower pressure the minimum pressure at the orifice itself corresponded to that at which the gas speed was equal to the velocity of sound in the gas. Any further reduction of the back pressure would have no influence upon the pressure at the orifice, and, consequently, the amount of fluid discharged would remain unchanged. Simple theory showed that, for frictionless adiabatic flow, this critical pressure was very nearly equal to half the initial pressure, and the explanation of Napier's experimental results was at once evident. Direct evidence of the actual drop of pressure along a jet was first given by Professor Stodola, of Zurich, who passed a search tube with a very small hole in its side through a nozzle from which steam was being discharged. The interior of the tube was connected to a pressure gauge so that the pressure it indicated at any moment was equal to that existing in the nozzle in the neighbourhood of the search tube hole. By moving the search tube along the axis of the nozzle a succession of pressure readings was obtained from which a curve of pressure drop could be readily construtced.

Estimation of Jet Efficiency

Since the object of any nozzle was generally to convert the heat energy of the flowing steam or gas into kinetic energy, it was important to know under what conditions this conversion would be most efficiently performed. In the extensive experimental work on this subject the method of research is for the greater part restricted to one, or a combination of two, out of three main methods. These were (1) determination of flow; (2) measurement of reaction; and (3) measurement of impact. Of flow measurements little more need be said than that they determined the flow in the individual cases examined. Deductions from such tests had been upset in many cases by what was once known as "excessive discharge"—the explanation of which was now based upon the supersaturated condition of the expanding steam. Measurement of reaction would appear to be of distinct value in determining efficiencies of expansion. The method, however, provided "overall" information only, and failed to give any indication of internal effects. The measurement of impact effect was generally considered to be most suitable for application to turbine work, but even here it had only a limited range. Like the reaction method, it was also of the "overall" type, but it had the additional demerit that it included in its operation any occurrence beyond the nozzle mouth, since the impact plate could not be made coincident with the nozzle outlet. Thus it would be seen that these three leading methods of inquiry were all, in the main, of one class. Each served to measure the overall effect, and any combination of them served only to amplify information of this nature and to give, at the best, but a limited range of knowledge regarding the flow. No light whatever could be thrown by them on the interior happenings along the nozzle, and the distribution of the losses throughout the expansion remains unknown.

A method had been developed by the author and his colleague, Professor W. Kerr, of examining the flow internally and of investigating the conditions at places on the jet where the expansion was only partially completed. Since the easiest measurement of this type was that of pressure, the adoption of this as an experimental basis naturally followed. The process involved the use of Professor Stodola's "search tube," which, when moved along the jet, gave the pressure at any desired position. Along with this a measurement of the weight of steam passing was also made, so that the double series of observations defined, for any fixed condition of expansion, one quality, the pressure, which varied along the jet, and the other, the mass flow, which was constant. The examination of the growth of the losses as the expansion proceeds might then be effected by means of the pressure changes in conjunction with the constant steam flow.

Characteristic curves showing the pressure drop along two simple convergent nozzles were shown. In each case the initial pressure was kept constant at 60 lb./in.^{2} (gauge), but the back pressure was altered to show five different ranges of working. The steam was superheated in all cases. In one case the lowest pressure attained at the end of the nozzle was 0·58 of the initial pressure, although the back pressure in the receiver was as low as 0·3 of the initial pressure.

In the other case, where the nozzle was made longer, the back pressure effects were seen to be very similar to those with the simple convergent nozzle. The lowest ratio reached was 0·5, as against the 0·55 of theory and the 0·58 of the preceding case, Since the only certain point of difference in the nozzles

was the loss per lb. of steam flowing, it would seem that the losses would have definite effects upon the critical range in such case. This point was well illustrated by experiments upon nozzles with different degrees of roughness of surface. In one case a nozzle with a polished surface was taken, and the curves of pressure drop obtained as in the nozzles previously described. The surface was then roughened and similar curves obtained. It was found that, under identical conditions of initial and final pressures, the throat pressure of the roughened nozzle was higher, and the outlet pressure lower than that of the polished nozzle. In some experiments made by his former assistant, Dr. D. Anderson, the full range of expansion with polished surface had an outlet pressure of 0·49, while with the roughened surface the ratio fell to 0·44.

Supersaturation

Some years ago it was noticed that, in many quite simple nozzle experiments, flow quantities were obtained in excess of those calculated on the assumption of isentropic expansion of saturated steam. It was obvious that the actual flow ought to be less than the theoretical, since any type of loss or imperfection in the expansion must reduce the discharge below the ideal value. Doubts were, therefore, cast upon the soundness of the underlying theory. This " excessive discharge " occurred only with wet steam or with steam which, according to the ordinary conception of vapour, would become wet during expansion. With the particular examples of steam flow given in the paper, the steam would remain superheated throughout and, in fact, the coefficient of discharge was always less than unity.

The explanations offered to account for this excessive discharge are based upon the assumption that rapidly expanding steam may be in a state of super-saturation. That is to say, the ordinary function of condensation was, for the time being, suspended and the fluid operates simply as a cold gas. In other words, instead of the expansion following the law $PV^{1\cdot13}=C$,—which gave the approximate relationship between pressure and volume for steam expanding in the normal condition without loss of heat—it followed that represented by $PV^{1\cdot3}=C$. The development of this idea was interesting. In the steam nozzle field the first to recognise the possibility of supersaturated expansion was Lorenz in 1903. The suggestion was examined by Stodola who pointed out that the conception involved excessive discharge and since, at that time, there was no clear evidence of this phenomenon he was led to believe that the occurrence of supersaturation was unlikely in nozzle expansion. With the definite establishment of the fact of excessive discharge in nozzles passing saturated steam the idea of supersaturation was independently and successfully resurrected by Martin, in 1913, and placed in a sound position as an important influence modifying the ordinary expansion theory used in turbine design.

Compression Losses

In the application of steam jets to chemical engineering processes it was probable that much greater use was made of jet apparatus for extracting gas and vapour from á region of low pressure and delivering it to one of high pressure than of simple convergent jets. Such apparatus was now being extensively used in steam engineering plant where steam ejectors in one, two, or three stages were employed to extract the air and steam vapour from condensers working under high vacuum and deliver it to the atmosphere. Since the steam jet had to draw in the gases from a region of low pressure. it was evident that it must itself be capable of expanding to a still lower pressure, and that the simple nozzles already described would be of no use for such a purpose. It had already been shown that, with such simple nozzles, the maximum amount of expansion that could be effected would reduce the pressure to about half its entrance value. To obtain still lower pressures the nozzle must be extended and beyond the minimum section a gradually diverging portion must be included. This produced the well-known convergent divergent nozzle, the pressure drop in which was governed almost entirely by the relation between its minimum and end sections.

Illustrations of the way in which the steam behaves when passing through such a nozzle were given. The nozzle was designed to expand to a pressure ratio of about 0·19, and under such a condition of back pressure the pressure along the nozzle fell continuously to this value. With a higher back pressure, instead of the pressure line rising as might have been anticipated, expansion went on until the pressure was well below the back pressure, and recompression followed to bring it up to the proper value. As the back pressure was continually increased no change took place in the throat condition until the back pressure rose to 0·75 of the initial pressure. This meant that up to this high exhaust pressure value the flow remained unchanged. The failure readily to influence the throat pressure on increase of outlet pressure was due to the fact that the steam speed in the tail length was well above the velocity of sound. The pressure alteration could only be propagated backwards with the speed of sound, and hence the pressure rise was restricted to the least possible length. One outstanding feature of the curves was the low value shown for the pressure at the nozzle throat.

Of the actual losses that took place during the compression stages in any steam ejection plant practically nothing was known. It was considered, however, that an estimation of the losses during the compression stages in the nozzle just described would provide valuable information, and an effort to measure these losses by the search tube method was made. While the result showed that the efficiency fell to a considerable extent, the minimum values were not excessively low and the actual variation somewhat as would be expected. When, however, a detailed examination of the losses was made several discrepancies were discovered, and it became evident that the assumption of a completely filled outlet section was at fault. Satisfactory evidence was given that the assumption of completely filled areas was correct for cases of continuous expansion, and for compressions commencing at the nozzle throat. It was shown to be faulty during compression ranges, and it was also evident that where compression started at an intermediate point in the tail length the jet formed its own throat independently of the nozzle boundary. Thus it appeared that for all recompressions commencing beyond the throat of a divergent nozzle the flow areas were uncertain.

The latter portion of the paper demonstrated how great a fault it was to make a convergent divergent nozzle with a ratio of the final to the throat area too large.

Variations in Atomic Weight of Boron

A REDETERMINATION of the atomic weight of boron, affording evidence of variation in the isotope-ratio for samples of diverse origin, formed the subject of a paper by Dr. H. V. A. Briscoe and Mr. P. L. Robinson which was read by the former at a meeting of the Physical and Chemical Section, held in the Chemical Lecture Theatre of Armstrong College, Newcastle, on Monday.

Boron is the essential element of borax and boric acid. What has been found, Dr. Briscoe stated, was that boron from an American source had an atomic weight of 10.840, while that from two European sources approximated to 10.820. This was the first evidence that the proportions of the two isotopes, the two different kinds of boron that exist together in nature, could vary according to the source. It was the first definite evidence yet obtained that the atomic weight of an element from different sources might be different, and if that was found to be the case with other elements, it would be of profound significance for knowledge of the origin of the chemical elements.

Classified Poison Changes

AN order has just been made by the Privy Council authorising a number of alterations in the list of poisons which no chemist or licensed person may sell without requiring the buyer's signature and complying with other formalities.

Hitherto preparations of arsenic, except in the form of medicinal preparations, have not been in part 1 of the poisons schedule. Under the new regulations vendors of compounds containing arsenic will only be able to sell to persons who are known or introduced to them. They will be required to enter each transaction in the " poisons book," and obtain the signature of the purchaser.

Another important alteration is the deletion of the word " vegetable " from the entry " vegetable alkaloids " in the schedule. The effect of this will be to restrict the sale of poisons which are now made, or may in future be made, synthetically—for instance, the sale of synthetic substitutes for cocaine has hitherto been unrestricted.

Chemical Constitution of Azo Dyestuffs

Paper by Dr. A. Schedler

On Friday, March 6, the members of the Manchester and Liverpool Sections of the Society of Chemical Industry held a joint meeting at the Textile Institute, Manchester, Dr. H. Levinstein presiding.

A paper on "Chemical Constitution and Properties of Azo Dyestuffs" was read by Dr. A. Schedler, the technical manager of the Clayton Aniline Company.

Dr. Schedler said he would confine himself mainly to a review of the azo colours on account of the limitation of time and experience, and also on account of the fact that they represented the most varied and most complete class of dyes in every respect. More than 50 per cent. of the dyestuffs enumerated in the new *Colour Index* belonged to the azo class. Colours could be described as organic chemical products which dyed vegetable or animal fibres in a certain shade and with a certain degree of fastness. This definition was, of course, neither up to date nor complete, but covered the items with which he was going to deal. He was, therefore, dealing with the chemical constitution of a dyestuff on the one hand, and with shade, application to the various textile fibres, and fastness of the dyestuffs, on the other hand.

Like all chemical compounds, organic dyestuffs were either bases, acids, or neutral products. In practice the dyestuffs were mostly of the third category, *i.e.*, salts. The acid in this case was quite of secondary importance, consisting mainly either of sulphuric or of hydrochloric acid, so that the dyestuff was either in the form of a sulphate or hydrochloride. When other acids were used it was with the object of obtaining a practical result; for instance, to obtain a more soluble or insoluble product or a product which was easier to prepare or separate or more stable in manufacture or storing. Sometimes a certain dyestuff formed a particularly suitable salt with some special acid; for instance, Malachite Green with oxalic acid or a suitable double compound, as in the case of Methylene Blue in the form of zinc double salt.

Quite analogous was the case of acids, where the dyestuff molecule was an acid neutralised by any organic or inorganic base. In practice, this would largely be alkali or ammonia, and here, too, the manufacturer was guided entirely by practical requirements as in the case of the bases. The acid nature of the dye molecule was due to the acid character of the particular compound, in most cases through the presence of some "acid radicle," usually sulphonic acid. It was, therefore, possible by the introduction of such an "acid radicle" to transform one colour from a basic to an acid colour, for instance, by ordinary sulphonation. It might be asked whether there were not any colouring matters possibly representing salts made by the neutralisation of a colour base with a colour acid. Such products had been tried, but obviously not with the desired practical effect; the expected intensity did not result, and the shade and fastness was not sufficiently different from what one might expect from a mixture of the two colours to justify the assumption that the intended reaction had taken place.

The last category was called neutral dyestuffs, which did not mean salts of either basic or acid colours, but meant that the dye molecule was not capable of forming salts either with acids or bases respectively. A different way to bring these into solution, from which they could be taken up by the fibre, had to be followed, namely, a partial reduction to a so-called leuco compound.

These different chemical properties classified the dyestuffs, not only theoretically but also for practical application, into three groups, namely, basic, acid, and vat dyes. For certain purposes, insoluble neutral dyestuffs could be used in their original form when the product to be dyed had an affinity for the respective colour or acted as a solvent for the same, as in the case of the so-called spirit, fat, or oil colours. With regard to practical applications, certain dyestuffs might belong to two of the above classes; for instance, anthraquinone sulphonic acids could act as vat colours as well as acid colours.

In the early days of colour making one fact was noted as outstanding, namely, that dyestuffs contained only a very limited number of elements, and might contain besides carbon, hydrogen, and oxygen the ordinary elements of inorganic products, chiefly, nitrogen, and, in certain cases, sulphur. The presence of these elements was found to be due to their adaptability to form certain organic groups, and these groups were "unsaturated radicles," which would explain the fact that all colouring matters could be reduced to colourless products.

The Quality of Fastness

Dr. Schedler then dealt in detail with the characteristics of azo dyes generally, and their application to the various forms of commercial fibres. What was required, he said, of a dyestuff was that it should dye a fibre with a certain amount of fastness. In regard to fastness to alkali and acid, this for practical purposes could be explained as being due to the formation of unstable salts of various colours. The changes were brought about by alteration of these salts by a stronger or weaker acidity or alkalinity respectively in the dye solution or on the fibre. They could deal, therefore, with fastness to alkali and acid together, especially as a great many dyestuffs showed both these faults at the same time. A great many cases could be explained chemically. They knew, for instance, that azo products with phenol or salicylic acid, or with alpha-naphthol, were very susceptible to alkali, altering their shade completely. They also knew how to counteract this in the case of phenol combinations by esterification, as, for instance, when transforming brilliant yellow into chrysophenine, making it fast to alkali at the same time. In the case of phenol, as well as alpha-naphthol, satisfactory products were obtained when the azo group was diverted into the ortho position to hydroxy. It was, further, well-known that certain groups of slightly acid character present in the colour molecule rendered the colour susceptible to alkali. Such a group, for instance, was the "Imid" group. Susceptibility to acid was due to the presence of the amido groups, and was more pronounced in the case of benzol derivatives and alpha-naphthylamine than in the case of beta-napthylamine derivatives. The presence of a hydroxy group at the same time often seemed to counteract the effect of the amido group, with the result that amido naphthol derivatives gave faster products than the naphthol or naphthylamine products.

Dr. Schedler then dealt with the problems of fastness to washing and fastness to light.

On the motion of Dr. Rowe, editor of the *Colour Index*, seconded by Dr. Conroy, a vote of thanks was passed to Dr. Schedler.

Oil Shales

To the Editor of The Chemical Age.

Sir,—Mr. Worsley's letter in your issue of the 7th inst. is interesting. He points out the obvious fact which, unfortunately, is very rarely appreciated—that is, he asks for an oil yield for a given set of conditions which will return a revenue greater than expenditure. One of the conditions he names is that the material must be "amenable to treatment." Such a condition we know will apply and plays a large part in the majority of retorts, but we have not yet found a material which has not been amenable to treatment in the Fusion Retort, and these materials include Tilmanstone (Kent) coal, and Esthonian oil shale.—Yours, etc.,

The Fusion Corporation, Ltd

Middlewich, Cheshire.
March 11.

Synthetic Resins

To the Editor of The Chemical Age.

Sir,—Regarding Mr. Attwater's interesting letter in your issue of the 7th inst., and the encouraging prospects he presents for synthetic resin manufacture in Great Britain, you must allow me to remind you that the quotation from M. Kimpflin's estimate of the world's production of synthetic resins referred to *monthly* output and was reported as such by you. I hesitate to make this correction, as it may appear to draw attention to lack of British enterprise. From the report of the activities of Messrs. Attwater and Sons this would evidently be an erroneous impression to leave with your readers.—Yours, etc.,

Alan A. Drummond.

The Lodge, Ivor, Bucks.
March 9.

Works of the Clayton Aniline Co.

Visit and Tributes by Chemical Industry Members

THE Manchester and Liverpool Sections of the Society of Chemical Industry were the guests of the Clayton Aniline Co., Manchester, on Friday, March 6, and were entertained to luncheon at the Midland Hotel, Manchester. Mr. W. Welsh, a director of the Company, presided.

A Healthy Society

The CHAIRMAN, in proposing the toast of "The Society of Chemical Industry," expressed a hope that they would all be interested by their visit to the works. Something would then be seen of what was being done to meet the great necessity of supplying this country with a colour industry. The present state of things was causing great anxiety to many people, but it was certain that with co-operation between science, labour, and those who supplied the capital the needs of the nation could be adequately satisfied. The Society of Chemical Industry was founded some 46 years ago, and he believed he was one of its original members. It was born in the Chemical Theatre of the Owens College, and Professor Roscoe was its father. The name of Roscoe carried great weight in the chemical world in those times, and it was largely owing to his efforts that the Manchester University had developed so highly and fully on the chemical side. The Society was to be congratulated upon the tremendous advance it had made.

Mr. W. J. U. WOOLCOCK, President of the Society, in responding to the toast, said that the Society was in very robust health at present. In fact there was rather a difficulty in restraining the more impetuous, advanced, and revolutionary members than in having to prod them on. The times, industrially speaking, were not happy, though perhaps the chemical trade was not so depressed as others. The co-operation between the Clayton Aniline Co. and those dyestuff firms which were members of the Association of British Chemical Manufacturers had been very complete.

Dr. CONROY responded to the toast on behalf of the Liverpool Section and DR. LEVINSTEIN on behalf of the Manchester Section.

"The Clayton Aniline Co."

Dr. H. LEVINSTEIN, who proposed the toast of "The Clayton Aniline Co.," said he had known the Company for the whole of his working life and had always found himself opposed to them. (Laughter.) He had never heard that they had said a kind word about him, and never, so far as he could recall, had he said a kind word about them. (Laughter.) He felt now that it was a great privilege to him to be able to thank the Company for their delightful hospitality, though, in the words of the Psalmist, he felt rather like the lion frisking about among the lambs, or perhaps it was he who was the lamb frisking about among the lions. (Laughter.) It was with very great pleasure that he looked forward to their visit to the works of the Clayton Aniline Co. He had been through quite a number of aniline dye factories—mostly since the war. Before the war, it was not quite so easy to gain admission to the great German factories. Those of them who had had a good deal to do with the prohibition of imports of dyestuffs, and afterwards, when this was pronounced to be unworkable, with the subsequent passing of the Dyestuffs Import Regulation Act, 1920, were very gratified to see that the Clayton Aniline Co. were making use of the protection afforded by this Act. This vital industry should be protected. The Clayton Aniline Co. had realised that success in the industry was not obtained by short cuts. It could be assured only by consistent hard work directed over a number of years by people whose minds had been trained for the purpose of achieving the object in view. The Company was controlled and managed to-day by serious people who had spent their whole lives in the industry. It was to that factor that they owed the great success of which they were all to have visual proof that afternoon.

Mr. A. E. PEAK, the commercial manager of the Clayton Aniline Co., in responding, referred to Dr. Levinstein's remark that he could not recall that the Clayton Aniline Co. had ever said anything nice about him. Well, he would do so now—he thought Dr. Levinstein a most delightful man. (Laughter.) Dr. Levinstein had referred to the protection afforded to the dyestuffs industry, and he was particularly glad it had been mentioned. The Company had really seriously attempted to do their bit, and if they had succeeded in satisfying all concerned they would be amply repaid for their efforts.

Visit to the Works

The guests then proceeded to the works of the company, over which they were conducted in four parties. The works cover an area of 35 acres, and there are upwards of 50 highly trained specialists in colour chemistry and colour application constantly engaged, together with over 1,000 employees. The works possess direct access by its own sidings to the L.M.S. Railway, and also access to the L.N.E. Railway system of canals. The manufactures comprise a complete range of organic dyestuffs; and all intermediates used are made in the works. There are also large engineering and kindred establishments, most of the plant used being made on the premises. Some idea of the extent of the manufactures may be gained from the following facts:—6,000 to 8,000 tons of concentrated sulphuric acid, and an equal amount of oleum (fuming sulphuric acid) are used each year. The manufactures comprise approximately 200 different products, while 250 tons of ice per week is required, for the production of which the Company has installed a large plant. 12,000 tons of organic intermediates are manufactured each year, including 4,000 to 5,000 tons of aniline, and from the intermediates are made a wide range of colours of all descriptions amounting to 4,000 to 5,000 tons per annum. The shares of the Clayton Aniline Co., Ltd., are held by three colour firms in Basle, Switzerland, namely, the Society of Chemical Industry, J. R. Geigy, S.A., and Sandoz Chemical Works.

Manchester Chemical Industry Section

Resignation of Mr. L. Guy Radcliffe

AT a joint meeting of the Manchester and Liverpool Sections of the Society of Chemical Industry in Manchester on March 6, reference was made to the impending resignation of the honorary secretaryship of the Manchester Section by Mr. L. Guy Radcliffe, who has fulfilled the duties of that position for the past six years.

Dr. H. LEVINSTEIN, who presided, said that Mr. Radcliffe had done his level best to make the Manchester Section the best in the Society. For some time he had been carrying out his duties with difficulty, and was now unable to devote as much time to their fulfilment as their importance required. Speaking as chairman of the Section, he could not possibly have had a more loyal secretary, nor one who was more efficient and pleasant to work with. They would all feel very poignantly the loss they were about to sustain.

Mr. RADCLIFFE, who was heartily welcomed, said he felt his present position keenly. While his task had been very arduous, it had been a very honourable and joyous one. His predecessors in office left him a legacy of love and efficiency which he had strenuously endeavoured to live up to, and to relinquish it all, as he purposed doing after that evening, was a tremendous break. The Manchester Section had been one of his dearest affections, and during his term of office he had always had the happiest of happy meetings. Everyone had shown the greatest enthusiasm in advancing the aims and objects of the Section, and, therefore, of the Society as a whole. He had had a succession of the most wonderful chairmen any secretary could hope to have. The late Mr. William Thomson came first, then Mr. John Allan, followed by Dr. Ardern, and, finally, their present chairman, Dr. H. Levinstein. They were all quite different types, but they had exhibited one common characteristic; they had all gently drawn him along the path of official duty and taught him how to do things—and he got the credit for it. The mantle of office was now about to fall upon his successor, and it represented one of the most honourable and sacred responsibilities which could ever be placed upon the shoulders of any man. Manchester was the birthplace of the Society of Chemical Industry, and had always had a great influence in regard to its later life. Manchester, therefore, could not afford to have slack people as secretaries, nor, quite rightly, did Manchester look upon slack people with sympathy. Only reasons of health would have caused him to resign his position. He did not feel equal to carrying on the task with the same enthusiasm that he commenced it six years previously.

On the motion of Dr. Levinstein, seconded by Mr. John

Allan, it was decided that a suitable record be made in the minutes referring to the services of Mr. Radcliffe, and expressing the Section's feeling of profound gratitude for all that he had done on its behalf.

Mr. Radcliffe, in acknowledging the help received from the London headquarters, referred to the very real and substantial support accorded him by the scientific journals, which had always done their utmost to assist him in the furtherance of the interests of the Manchester Section.

Society of Public Analysts

At an ordinary meeting at the Chemical Society's Rooms, Burlington House, on Wednesday, March 4 (Mr. G. Rudd Thompson, president, in the chair), certificates were read for the first time in favour of Messrs. G. W. F. Holroyd, M.A. (Oxon), F.I.C.; C. E. Keeley; A. F. Macculloch, M.A., B.Sc. (Edin.), A.I.C.; F. V. N. Mitchell; C. H. Thomson and W. P. Whitley, B.A. (Oxon). Certificates were read for the second time in favour of Messrs. D. J. T. Bagnall, A.C.G.R.C., A.I.C.; R. H. Coysh, M.Sc., A.I.C.; G. Van Barneveld Gilmour, B.Sc., A.R.C.Sc.I., A.I.C.; P. May, D.Sc., F.I.C.; J. Parry; W. Smith, B.Sc., A.I.C., and Miss W. Wright, B.Sc., A.I.C. Mr. Thomas Mann was elected a member.

Abstracts of Papers

In a paper on "The Investigation of Ventilation Conditions," Mr. Robert C. Frederick gave a survey of the ideas in regard to ventilation which were current in the past, and showed that it was only in recent years that conditions and requirements had been fully understood. The most important demands were that the air of a space should not contain carbon dioxide in excess of 0·12 per cent. (so as to ensure that the respiratory addition would be diluted to a certain minimum extent, and in consequence that the probability of illness being contracted from a carrier would be reduced correspondingly); and that it should be maintained at a hygienic level of movement (so that heat loss from the individual might not be retarded as this was the chief cause of the discomfort experienced when living in badly-ventilated spaces). Methods to be employed in investigating to what extent these requirements were being fulfilled in practice were detailed, and the paper concluded with a bibliography of the most important references.

"A Simple Self-contained Spectroscope Lighting Unit" was described by Messrs. Robert C. Frederick and E. R Webster. The apparatus is designed with particular reference to examination of blood in suspected cases of carbon monoxide poisoning. A pocket torch of specified type is clamped on a retort stand in such a way that the clamp actuates the switch. A small wire frame, the construction of which was described, holds the cell containing the specimen securely in place before the light.

Mr. P. K. Frolich, in a paper on "The Carbon Error in the Quantitative Deposition of Nickel and Iron from Complex Oxalate Electrolytes," pointed out that the different variables governing the process of electro-deposition of nickel, with stationary electrodes, had been varied within wide limits, but it had not been possible to prevent contamination of the precipitated metal with organic matter. Unlike nickel, however, iron was not contaminated at the beginning of the deposition. Before the iron was completely removed from the electrolyte, however, organic matter started to build up in the cathodic deposit. Ammonium chloride would prevent contamination of the deposited iron for a period more than sufficient for quantitative precipitation. A standard method was recommended for the electrolytic determination of iron.

"A New Method for Determining Butter Fat" was dealt with by Mr. G. Van B. Gilmour, B.Sc., A.R.C.Sc.I., A.I.C. The process described gives a distillation number which is a measure of the butyric acid present in the fat. The number obtained corresponds to the Kirschner number, but is not influenced so much by coconut group fats as is the latter. A determination by the method can be completed in less than an hour. Special reference is made to the determination of butter fat in margarine.

"Chemistry and Civilisation"

Sir Max Muspratt's Address to London Sections

SIR MAX MUSPRATT had a large and keenly interested audience, composed of members of the London Sections of the Society of Chemical Industry and of the Institute of Chemistry, on Monday evening, at the Institution of Mechanical Engineers, to listen to his address on "Chemistry and Civilisation." Sir Robert Robertson, the Government chemist, who presided, at the close aptly described it as "a philosophic address of intense interest," and the only complaint made by Mr. Woolcock and Dr. Dyer, the respective speakers for the two societies, was that it had not been twice as long. It is true that the audience would gladly have heard Sir Max at greater length on many of the points dealt with; but what an art it is always to be five minutes too short rather than ten minutes too long!

The address was of a kind which, many must have felt, is too rarely heard at chemical assemblies, for it interpreted chemistry not merely in terms of formulæ and equations, but in terms of industrial and social achievement which the public can understand. And if, as we are constantly being told, the nation needs to be educated respecting its indebtedness to chemistry the work can only be done in that way. Sir Max has spoken on the same subject to American and English gatherings, and one imagines that though familiar ground is covered on each occasion new points are constantly being developed as they were on Monday evening. Already the address contains the substance of an admirable popular history of industrial chemistry for inclusion in the Wembley Library of this year.

But the address was not only a very useful history; it was full of stimulating suggestions as to future developments, and treated with real imagination the relation between chemistry and the needs and organisation of society. Sir Max adhered to his claim that chemistry, even more than physics or engineering, had lain the foundations of modern civilisation; indeed, without its aid and resources the modern increase of population and the great aggregates of mankind brought together by industrial conditions could not have been supported. Like most thinkers and investigators Sir Max's mind turns to the wonderful chemistry of Nature as the model that laboratory chemistry must follow. As he remarked, the chemist had dissected Nature, as in the field of metallurgy; he had stimulated Nature, by means of fertilisers, etc.; and he had substituted Nature as in the case of dyestuffs. The remaining work was to wrest the secrets of Nature, and the chemist had yet a long way to go to reproduce the perfect chemical processes of Nature.

Future Fields for Development

Two fields from which much might be expected in the future were biochemistry and radio-activity where research was busily at work. Among the notable achievements of recent times were mentioned the fixation of atmospheric nitrogen and the production of synthetic sugar, while attention, it was suggested, might also be given to the natural supplies of phosphate in the soil and to the salt supplies of the sea. Finally we had a generous plea for the fuller recognition of the human factor in industry. Industrial developments in the past century had so far outpaced our moral and intellectual development that there was danger of the human factor being swamped by the machine. Humanity, however, Sir Max insisted, could not be "downed" in this way; it would revolt against its suppression by material forces, and the address closed with a fine appeal to chemists to exert their scientific and intellectual influence in building up a humane and enlightened public opinion.

The Chairman, who visited Canada and the United States last year at the same time as the lecturer, made an interesting reference to Canadian chemical developments. The members of the British Association, he said, were impressed by the growth of great chemical industries in Canada, which meant that Canada might presently be exporting chemical products which were now imported. That might be bad for the British manufacturer, and he had heard it suggested that British capital and British chemists should be associated with Canada's chemical industry rather than that Canada should be developed by United States capital and technologists.

Softening Hot Water Supplies

The Colloidal Treatment

TREATMENT in relation to heating and domestic hot water supplies formed the subject of a paper by Mr. W. B. Lewis, manager of the Feed Water Specialists Company, Maxwell House, St. Paul's Square, Liverpool, before the members of the Institute of Heating and Ventilating Engineers, at the Engineers' Club, Coventry Street, London, on Wednesday, March 4. The subject was illustrated with demonstrations by Mr. G. S. Irving, chief chemist to the company, and there were on view numerous sections of scale, corroded tubes and boiler plates.

The colloidal state of water, Mr. Wells said, in pre enting the paper, was not synonymous with super-saturation. A liquid containing a very insoluble substance in solution beyond its usual degree of solubility was said to be in a colloidal condition. Matter was divided into three states—namely, solid, liquid, and gaseous. Modern discoveries called for a further division of the solid state. It was now possible with many chemical substances to so reduce the size of their particles that, when added to water, the solution looked clear or only faintly opal. These could be filtered unchanged, but colloids were not capable of passing through an animal membrane.

Colloid meant " glue-like," and a colloidal solution was one in which a finely divided substance did not coalesce. A colloid in solution was said to be in the " sol " form ; but if it jellified, coagulated, or was precipitated, it was said to be in the " gel " form. When a colloid was precipitated, it changed from the " sol " to the " gel " form by virtue of losing its electric charge—a purely physical process, and not a chemical one. The majority of colloidal particles had an electric charge. The source of the electrification had not yet been determined, but research pointed to adsorption of either the positive or the negative ions. A colloid was precipitated by passing an electric current through a solution of it.

Colloidal iron hydrate, a yellowish brown solution, was then employed by Mr. Irving to demonstrate how the electric current deposited it on the negative wire and charged it into ordinary hydrate of iron. Also was shown a chemical substance called algor, used in the colloidal treatment of feed waters. This was deposited as a jelly on the positive wire, thus showing that it had a negative charge.

Colloidal Chemistry

In dealing with the application of colloidal chemistry to feed water problems, Mr. Wells explained what was known as " protective " colloids. Gum and gelatine were often used to stabilise emulsions—especially in pharmacy, as affecting cod liver oil emulsion. The gum acted as a protective colloid around each particle of oil, and prevented it from separating out. Ice cream made with gelatine was smooth and rich in appearance and taste ; but, without gelatine or eggs, ice cream would be granular and gritty.

Chalk in a water softening plant formed by the interaction of lime and soda was partly in a colloidal state. Under the first influence of heat that state was lost and chalk was precipitated as ordinary heat-retarding incrustation. That was why scale was commonly found at the heat end of economisers where a water-softening plant was employed. In the absence of a softening plant, the introduction of soda in the water produced a chalky deposit. The better plan was to cause the scale salts to form a colloidal jelly by the addition of a protective colloid, especially if the " gel " so formed was capable of absorbing suspended matter and retaining moisture at high temperatures. Instead of a crystalline deposit, there would be a flocculent precipitate with the colloidal treatment, and the deposit would be easier to remove.

The Algor Colloid

In a demonstration by Mr. Irving on the colloidal treatment, the algor colloid was used and a hard water (calcium chloride) added. The jelly during precipitation was seen to change from the " sol " to the " gel " form. Another test followed, in which was also employed powdered charcoal, representing the suspended matter and impurities in the feed water. The absorption of the charcoal and the clarifying of the water were evident, and Mr. Wells stated that the particular colloid did not offer any resistance to free steaming.

It mattered little how corrosion of iron and steel took place if one could state a limit for boiler waters in which it would not take place, said Mr. Wells. The most convenient method was by stating its hydrogen-ion-concentration in terms of Ph. value. Pure water had a Ph. value of 7 : alkaline solutions had higher values and acid solutions lower values. A treated boiler feed water should have its Ph. value over 9. Litmus was not a sufficiently sensitive indicator. A special indicator which had been invented gave more than seven different colours, and these were in correct spectrum order from the strongly acid side to the strongly alkaline side. In all cases, water should be tested for total hardness and then with the indicator.

Mr. Irving at this point gave a demonstration with an indicator which produced all the colours of the rainbow, and enabled an experimenter instantly to determine the reaction, even with waters which had only a faint reaction to litmus.

Mr. Wells, in dealing with oxygen and corrosion in boilers and furnace tubes, said that a water rich in alkaline salts, retained more oxygen at a high temperature than raw water did. Magnesium chloride split up under boiler pressure, and gave hydrochloric acid, which caused pitting and grooving in plates. The effect on the iron was to produce iron chloride, which in its turn split up and gave black oxide of iron and acid back again, the corrosion thus becoming a cycle. Chemicals for effectually dealing with such substances could be introduced into a colloidal treatment.

Lime soda did not wholly deal with dissolved gas of the character he had described : the introduction of an oxygen absorbing reagent was desirable, and it was essential to compound it into the reagent introduced into the feed water to be treated. If the water was properly treated, neither hard scale nor corrosion need be present ; but even if it were, collodial treatment would gradually soften and rot it away. Calorifiers which were adapted for colloidal treatment were usually fitted with a run-off tap by which the sludge formed could be removed.

Having described the treatment of water heated for domestic purposes, Mr. Wells said that the colloid used could be either liquid or in powder form. But the correct treatment of water required a previous careful examination of the water as well as a close investigation into the engineering conditions under which the water had to operate. There was no such thing as a universal specific, and efficient treatment was not entirely a matter for the laboratory. There were engineering features needing careful consideration, and these necessitated the co-operation of the chemist and the chemical engineer.

Modern Materials for Rubber Compounding

AT a meeting of the London and District Section of the Institution of the Rubber Industry, held in London on Monday, Dr. A. A. Somerville (vice-president of R. T. Vanderbilt Co., Inc., U.S.A.) gave a paper on " Modern Materials in Rubber Compounding." He dealt with the duties of rubber compounders, referred to existing materials, and suggested the need for new and more advantageous materials for this purpose. Dr. Somerville dealt at length with the question of organic separators and colouring materials for the rubber mix. A long discussion followed, and in reply to a question Dr. Somerville stated that he had been anxious to find an organic accelerator which would be efficient with antimony sulphide, but had not done so. Tetramethylthiuramdisulphide could be used with antimony if used in rather large amounts.

Chemical Engineering Catalogue

YET another chemical publication has just made its appearance in the shape of the " Chemical Engineering and Chemical Catalogue, 1925," published by Leonard Hill, London. In style it appears to be a modified form of a well-known American annual in which, instead of the usual displayed advertisements, the trade announcements take the form of descriptive notes on the various products and their industrial applications. With a rather elaborate index the catalogue is intended to serve as a permanent work of reference. It is well produced and is interesting as another phase of trade publicity.

Chemistry's Relation to Agriculture

Phosphatic Fertilisers

THE fifth of the lectures on "Chemistry in its Relation to Agriculture" was given by Mr. E. Holmes in the Chemistry Department of the University of Birmingham on March 4. It was shown that whereas nitrogenous and potash fertilisers either occurred naturally or were produced industrially as their soluble salts, phosphates occurred in bones and rock phosphates, or in basic slag, almost exclusively in the insoluble form. Since the soluble phosphates were, in general, the most useful plant foods it followed that the preparation of phosphatic fertilisers involved manufacturing processes, which meant that the supplies and prices were beyond the control of the agriculturist.

The three main sources of phosphates for agricultural purposes were bones, superphosphate and basic slag. Bones have been used for several centuries, but it was not until the beginning of the nineteenth century that their efficacy was recognised as due to the phosphate content. At the present time bones from the slaughter houses were sent to the central factory and sorted. The shank bones were picked out for cutlery and sometimes the hard bones for glue, although often any bones were extracted for glue. The various batches were then steamed at low pressure (20 lbs. per sq. inch or less) to remove the fat. In some cases this de-greasing was carried out using benzene, and extracting in an apparatus working on the Soxhlet principle, and since this was a more efficient method, the resulting material was richer in phosphate and nitrogen. The de-greased bone was then resteamed at higher pressure (60 lbs. or so) when the collagen of the nitrogenous mucilage took up water to give gelatine. This was dissolved out, and was concentrated to set, on cooling, as glue. The de-greased bone contained up to 5 per cent. nitrogen, and 50 per cent. of phosphorous calculated as normal calcium phosphate, while the second product contained only 1·5 per cent. nitrogen, with 55–60 per cent. of phosphate. Since either of these products were sometimes treated with sulphuric acid to make the phosphate more soluble (when it was known as "dissolved" or "vitriolised" bone), there were various types and grades of bone fertilisers. Of these ordinary bone meal, ground de-greased bone, was by far the most extensively used. It was a slow acting fertiliser, and was not of much use on calcareous soils; but it gave excellent results on lime-lacking soils and on soils rich in humus.

Superphosphate was prepared by grinding rock phosphates such as were found in North Africa, Florida, or such Pacific Islands as Christmas Island and Nauru, and then treating them with sufficient sulphuric acid to convert the normal phosphate to the soluble mono-calcium phosphate, and at the same time to decompose all carbonates, chlorides and fluorides present. The resulting gypsum helped to keep the product dry and friable. Iron and aluminium were generally considered objectionable in rock phosphates to be used for the making of superphosphate, since they tended to cause quicker "reversion" of the "super," i.e., the conversion of the soluble phosphate back to the insoluble form. It had now been shown that such rock phosphates could be made to give citric-soluble phosphates by simple heating with lime. Superphosphate favoured good root development in early stages of plant growth, it induced vigorous growth in plants which threatened to become too sappy, and it hastened ripening. Although soluble in dilute carbon dioxide solution it was retained quite well by the soil, very little finding its way into drainage water.

The older basic slag, a by-product of the basic Bessemer process for steel making, was a very good source of phosphate for plant food, when it was finely ground. Its solubility in 2 per cent. citric acid, the familiar and much maligned test for "availability" of phosphate, was high. Unfortunately for the farmer this process had now been almost completely superseded by the open-hearth process for steel manufacture, which, while being more convenient to the steel manufacturer, did not give such a rich or useful slag. When the growing season was long, and on wet and sour soils, this material was found to be of more use than its low citric acid solubility indicated. A repetition of the earlier work on the use of finely ground raw rock phosphate had led to a similar conclusion.

The Dyestuffs Licensing System

Criticisms in Parliament

MR. PALIN (House of Commons, March 10) asked the President of the Board of Trade whether he could state the price of synthetic indigo in Great Britain, France, Germany, Italy and India.

The President of the Board of Trade (Sir Philip Cunliffe-Lister): The price of synthetic indigo varies considerably with quantity and also according to the source from which it is obtained. I understand, however, that the prices for ordinary quantities in the markets named are as follows:—Great Britain, 1s. 3d. per lb.; France, 12 francs per kilo; Germany, 2 gold marks per kilo; Italy, 10 lira per kilo; India, 5s. 6d. per lb.

The above quotations are for 20 per cent. paste, except in the case of India, where synthetic indigo is usually sold in the form of 100 per cent. powder.

Captain Wedgwood Benn asked the President of the Board of Trade whether the Dyestuffs Advisory Licensing Committee published any particulars giving the names of the dyes for the import of which licences had been granted; and, if not, what safeguard exists against unfair discrimination between various applicants for licences?

Sir P. Cunliffe-Lister said that particulars of the dyestuffs for which licences were granted were not published by the Advisory Licensing Committee. The safeguard was the constitution of the Committee, and the fact that each application was considered separately.

Captain Benn asked how, if one firm objected to other firms getting the dyes which it had been refused, its doubts could be set at rest?

Sir P. Cunliffe-Lister said that such cases did not, in fact, arise, because the Advisory Committee, on which the makers were in a minority, treated all applications alike.

Captain Benn asked whether it was the practice of the Dyestuffs Advisory Licensing Committee, when asked for permission to import, to require the applicant to disclose the names of his customers and thereafter to furnish these names to the applicants' competitors; and, in general, on what grounds the Committee withheld licences.

Sir P. Cunliffe-Lister said that he presumed the question related to applications other than those made by actual users. It was not the general practice of the Committee to require applicants in such cases to disclose the names of their customers, but in certain cases, where licences would not normally be granted, it had been found necessary to require that the application should be made by the actual user. Licences were refused when the Committee were satisfied that adequate substitutes were available at reasonable prices from British manufacturers. The practice of the Committee was to find out whether a suitable British substitute was available. If there was not, a licence was granted.

The B.D.C.

Mr. Fenby asked the President of the Board of Trade whether it was intended to continue the appointment of the British Dyestuffs Corporation, Ltd., as sole agents in this country for the distribution of dyestuffs taken from Germany on reparation account?

Sir P. Cunliffe-Lister said that the operation of the reparation provisions of the Treaty of Versailles, so far as they related to dyestuffs, ceased on January 15 last. The agency service of the British Dyestuffs Corporation would be continued until the existing stock of reparation dyestuffs had been liquidated.

Lieut.-Commander Kenworthy asked if any decision had been arrived at as to whether, under the London Agreement of August 30, 1924, the Government would continue to indent on Germany for bulk quantities, or at all, of dyestuffs on reparation account as was the case up to January 10, 1925, under the Peace Treaty?

Sir P. Cunliffe-Lister said that the London Agreement provided that contracts for deliveries in kind (including dyestuffs) which were to be treated as being on reparation account, should be made under ordinary commercial conditions, that was, by contracts between buyers in the Allied countries and the German producers. It was not the intention of the Government to make any call on Germany for dyestuffs on Government account.

Chemical Matters in Parliament

Food Adulteration

MR. CHAMBERLAIN (House of Commons, February 26), in reply to a question, stated that the Committee on Food Preservatives were extending their inquiries to include the treatment of flour with chemical substances.

Oxalic Acid Import Duties

Mr. MacKenzie Livingstone (House of Commons, March 2) asked the President of the Board of Trade whether users of oxalic acid still had to pay an import duty, although this commodity was no longer manufactured in this country.

Sir B. Chadwick said that duty was chargeable on all oxalic acid imported into this country when not of Empire origin. The manufacture of that commodity in this country had been in suspense for some time, but he understood that preparations were now being made for its production here by a new process.

Fuel Research Grant

Mr. C. Edwards (House of Commons, March 3), asked the Secretary for Mines what proportion of the £30,000 granted by the late Government to the Fuel Research Board had been expended and to what purpose?

The President of the Board of Education (Lord Eustace Percy) said that the £30,000 referred to was intended as an ultimate expenditure on problems connected with the survey of the coal seams. The rate of expenditure must depend largely on the co-operation of the various coalfields. The expenditure under existing local committees had been materially increased, negotiations for the establishment of committees in other coalfields were actively in progress, and plans had been approved at the Fuel Research Station for new plant costing, approximately, £15,000.

Fuel Oil Imports

Sir P. Cunliffe-Lister (House of Commons, March 3), in reply to a question, said that the quantity of fuel oil registered as imported into Great Britain and Ireland during 1913 amounted to 95,062,000 gallons. In 1924 the registered imports into Great Britain and Northern Ireland amounted to 385,582,000 gallons.

Supply Figures

Supply figures agreed by the House on March 5 included the following: Australian Zinc Concentrates, £160,000; Government Chemist, £18,600; Scientific Investigation, etc., £92,000; Department of Scientific and Industrial Research, £150,000.

British Dyestuffs Imports

Mr. T. Thomson (House of Commons, March 6), asked the President of the Board of Trade what were the quantities, in weight, of dyestuffs imported during 1924 from Germany, Switzerland, France, America, and other sources, respectively; and what was the quantity of dyestuffs imported from Germany on reparation account during the same period.

Mr. A. M. Samuel gave the following figures:—

Quantities of Coal Tar dyestuffs registered as imported into Great Britain and Northern Ireland during 924.

Description.	Total Imports.	Consigned from Germany.	France.	Switzerland.	U.S.A.	Other Countries
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Intermediate Coal Tar Products.	648	456	169	23	—	—
Finished Dyestuffs obtained from Coal Tar—						
Alizarine	30,156	16,858	13,074	182	—	42
Indigo.....	—	—	—	—	—	—
Other sorts	40,976	27,905	367	10,485	24	2,195
Total.....	71,780	45,219	13,610	10,690	24	2,237

The quantity of dyestuffs received from Germany during 1924 on reparation account, and included in the above table, was 33,896 cwts.

Synthetic Nitrogen and Fertilisers

Mr. John Beckett (House of Commons, March 9) asked the Minister of Agriculture (1) what fertilisers were connected with fixated nitrogen and the agricultural value of these products; (2) the prices at which fertilisers connected with fixated nitrogen were sold; and what factories were producing them; (3) the monthly output of factories supplying fertilisers connected with fixated nitrogen; and whether the Government had any interest or control in any of these factories?

Mr. Wood said that the better-known fertilisers derived from atmospheric nitrogen were synthetic sulphate of ammonia, cyanamide, and nitrate of lime. All of these were of recognised value for agricultural purposes. The only plant turning out synthetic nitrogen products on a commercial scale, so far as he knew, was that of "Synthetic Ammonia and Nitrates, Ltd.," at Billingham-on-Tees, the output of which was in the neighbourhood of 120 tons a day. The Government had no interest in, or control of, the production of fertilisers by that company. Neutral sulphate of ammonia (21·1 per cent. nitrogen), which was, he understood, the quality produced by that factory, was being sold at present in 4-ton lots delivered to the farmer's station at 14 guineas per ton.

Mr. Beckett asked for an estimate of the amount of sulphate of ammonia produced from other sources.

Reparation Dyestuffs

Mr. T. Thomson (House of Commons, March 9) asked the Chancellor of the Exchequer how much in cash he had received from the sale of dyestuffs received from Germany on reparation account; the total amount credited to Germany against such sales; the total cost of distribution in this country by way of commission, etc., to the Government agents; details of such commission and other expenses allowed; and to what account had the balance between the net income and the amount credited to Germany been put?

Sir B. Chadwick said the last completed accounts for Reparation Dyestuffs were those for the financial year 1923–24. Up to March 31, 1924, the gross amount realised by the sale of dyestuffs was £1,383,569; the amount credited to Germany for deliveries to that date, including stock not then sold, was £1,068,139; the amount paid to agents for commission, freight, and distributing charges was £215,961, of which £109,015 represented commission and £106,946 freights and other charges. The net proceeds were paid by the Board of Trade to the Treasury as Miscellaneous Revenue.

Billingham Nitrogen Factory (Sale)

Sir L. Worthington-Evans, in reply to various questions, said that the Government Nitrogen Factory at Billingham was sold by the Minister of Munitions in April, 1920, to Brunner, Mond and Co., Ltd., for a company to be formed by them. He said that it would be contrary to the public interest to disclose the terms of the sale. He had asked the Surplus Stores, etc., Liquidation Department for information as to the original cost of the factory. The factory was sold by private treaty, but it was extensively advertised before sale. He had no information as to who was employed at the works.

Mr. Beckett asked whether it was a fact that Lieut.-Colonel C. P. Pollitt, D.S.O., who was a member of the Commission, was a director of Synthetic Ammonia and Nitrates, Ltd., who purchased the Government factory, and Sir L. Worthington-Evans said that he had not the slightest idea.

Sir L. Worthington-Evans, in reply to a question, said that the Commission sent to Oppau to investigate German methods reported direct to the Ministry of Munitions, and the documents relating to it were in the custody of the Treasury Surplus Stores, etc., Liquidation Department, not the War Office.

Capital in Fine Chemicals

Sir P. Cunliffe-Lister, in reply to questions, said that the reason why it was impossible to give figures of the total capital invested in fine chemicals was that a very large number of firms which manufactured fine chemicals also manufactured other kinds of chemicals, and it would be impossible to take out a proportion of the capital. He said that recent legislation had increased the manufacture of fine chemicals enormously in this country.

Chemical Warfare Research Expenses

Sir L. Worthington-Evans (March 10), said that the staff employed at the Chemical Warfare Experimental Station, Porton, consisted of 22 naval, military, and Air Force officers, 26 civilian scientists, and subordinate staff. Post-war expenditure was approximately:—1919–20, £90,000; 1920–21, £54,000; 1921–22, £81,000; 1922–23, £87,000; 1923–24, £103,000. The cost during the current year was estimated at, approximately, £115,000, increasing in 1925–26 to £132,000.

Australian Zinc Concentrates

Sir P. Cunliffe-Lister, in reply to a question, said that the latest completed accounts for Australian zinc concentrates were those for the financial year 1923–24. The net loss as from April, 1918, to March 31, 1924, was £1,328,000.

From Week to Week

FIRE DAMAGE estimated at £2,000 was done to the premises of Boase and Co., Ltd., bleachers, of Claverhouse, near Dundee, on Wednesday, March 4.

THE DANISH GOVERNMENT'S SERUM INSTITUTE at Copenhagen is to receive a gift of 1,100,000 Danish kroner from the Rockefeller Foundation, according to American Chemical Society advices.

BROTHERTON AND CO., LTD., and A. B. Roberts and Co., Ltd., chemical manufacturers, have made gifts of chemicals to the department of chemistry at the Bradford Municipal Technical College.

DR. ALFRED RÉE, of Manchester, was a member of the deputation from the British Chambers of Commerce which was received by the Chancellor of the Exchequer on Tuesday, in London, and which urged the reduction of income tax in the interests of industry.

A SCHEME IS PROPOSED whereby the more valuable assets of the firm of Clement and Johnson, proprietors of Yadil, are to be taken over by a new company. The petition for the compulsory liquidation of the original company was again adjourned when it came before Mr. Justice Romer on Tuesday.

PROFESSOR T. TURNER has been re-elected President of the Institute of Metals and Sir John Dewrance and Sir William Smith, Vice-Presidents. Mention was made at the annual meeting in London on Wednesday of a gift of £1,000 from Mr. L. Sumner towards a fund for providing a building for the Institute.

THE BRITISH AND FOREIGN METAL AND CHEMICAL CO., LTD., Newcastle-on-Tyne and London, state that the special department of their business as selling agents and merchants of chemicals, colours, and ingredients, together with the personnel conducting same, has been transferred, and will in future be known as the Cookson Produce and Chemical Co., Ltd., London House, 3, New London Street, London, E.C.3, to which address all communications should be addressed in future.

THE INQUEST was resumed at Middlesbrough on Tuesday concerning the death of Francis Lafferty, who was overcome by gas fumes whilst cleaning a furnace flue at Cochrane and Co.'s iron works. The factory inspector suggested that it might be practicable for some apparatus or mask to be used by the men whilst cleaning where there was gas. Medical evidence attributed death to carbon monoxide poisoning, accelerated by valvular disease of the heart. A verdict of "Accidental death" was returned.

THE MANCHESTER SECTION of the Society of Chemical Industry has over 500 members, and the retiring secretary, Mr. L. Guy Radcliffe, has been elected to the office of chairman for 1925-1927, with Dr. H. Levinstein as vice-chairman and Mr. Andrew McCulloch, of the College of Technology, as hon. secretary. The meetings of the Section are held at the Textile Institute on the first Friday of each month, and on April 3 Dr. C. H. Lander, Director of Fuel Research of the Department of Scientific and Industrial Research, will deliver an address on "Smokeless Fuel and Oil."

PROFESSOR KARL C. FORSAITH, associated with Dr. Brown in the Department of Wood Technology, New York State College of Forestry, Syracuse University, has accepted an offer from the English Government through the Imperial Forestry Institute at the University of Oxford to organise a department of wood technology at that university. As collateral to his work Dr. Forsaith will instruct students in wood technology and carry on such investigations bearing on wood technology as may be directed by the officials of the Imperial Forestry Institute. Dr. Forsaith will leave the College of Forestry at the end of the present session, and will sail on June 2 on the s.s. *Montcalm* from Montreal. The Imperial Forestry Institute more or less corresponds to the United States Forestry Products Laboratory at Madison, Wis., in which many of the research problems in forestry are investigated, especially those relating to the composition, fibre, characteristics, stresses and strains of various kinds of wood, the adaptability of certain species for specific purposes, and the effect that many preservatives and destructive agencies have upon commercial wood products.

THE PRINCE OF WALES has agreed to accept the presidency of the British Association on the occasion of the Association's visit to Oxford in 1926.

DAMAGE ESTIMATED AT NEARLY £40,000 was caused by a fire at the premises of William Davidson, Ltd., wholesale druggists, of Aberdeen, on Monday.

THE HONORARY DEGREE of Doctor of Science has been conferred by Durham University on Sir Albert George Hadcock, F.R.S., director of Armstrong, Whitworth and Co. and of the Thames Munition Works.

THE SWISS CUSTOMS TARIFF is to be revised and proposed alterations will include a reduced duty on calcined alumina in the interests of the aluminium industry. The Argentina Tariff will also be revised shortly.

THE FLINT GLASS TRADE is protesting against the decision of the Board of Trade that it cannot regard the industry as sufficiently important to be eligible for an inquiry for the imposition of some form of protection. A deputation is to be sent to the Board of Trade.

THE LONDON UNIVERSITY SENATE has awarded the degree of D.Sc. to R. Robinson (biochemistry), Lister Institute, G. R. Clemo (chemistry), Queen's College, Oxford, and F. Simeon (physics) University College. The degree of M.Sc. has been awarded to J. C. Hudson (chemistry), Imperial College, and to H. J. Channon (biochemistry), University College.

A REPRESENTATIVE of the dyestuffs and chemical trade will be on the new London County Council in the person of Mr. E. G. Sawyer, of the firm of E. G. Sawyer and Co., Dominion House, Fenchurch Street, E.C.3, who at the recent election was returned at the top of the poll for West Lewisham, as a Municipal Reformer. The poll was very heavy, Mr. Sawyer securing 6,652 votes.

"NITRATE OF LIME: its Production, Properties, and Practical Use in Agriculture" was the subject of a lecture delivered by Mr. Bernard Bull, agricultural adviser to the Nitrate Trading Co., to the Bere Alston Agricultural Discussion Society on Tuesday, March 3. The processes of manufacture were described, and the lecture was illustrated by films and slides showing factory methods.

A DONATION OF £35,000 towards the cost (which is estimated at from £90,000 to £100,000) of erecting at Edgbaston further buildings to accommodate the three Biological Departments of the University of Birmingham—Botany, Zoology, and Brewing, with the Fermentation Industries—has just been made by Mr. W. Waters Butler (chairman of Mitchells' and Butler, Ltd., brewers, Birmingham). Mr. Waters Butler was a chemistry student at Mason College, Birmingham, and at the Midland Institute.

THE SPRING ISSUE of "Farm Notes," published by the British Sulphate of Ammonia Federation, appears appropriately at a time when the weather conditions promise to become favourable for the use of artificial fertilisers. The editor, Mr. T. H. J. Carroll, has got together an interesting collection of notes, of practical interest to all cultivators of the soil, and emphasis is placed on the importance of the Federation's free advisory service. The staff of this department covers the whole country, and an excellent photographic group of the eleven members is published.

MR. A. D. SHEASBY, B.Sc., at a meeting of the Birmingham University Chemical Society on March 2, in a paper on "Cellulose and Cellulose Products," showed the chief sources from which cellulose is obtained, and explained that although cellulose is so widely distributed in nature, its exact constitution is unknown. Cellulose as a fibre was then dealt with, and the rise and development of the chief textile industries considered. The use of cellulose in the paper-making industry was shown, and the methods generally employed were outlined. Specimens of various fibres were shown, together with wood pulp from the sulphite and sulphate processes, and also specimens of the finished articles. The lecturer discussed cellulose as a chemical compound, and dealt with the derivative products—explosives and other nitro derivatives, cellulose xanthate, the viscose reaction, and the acetate, from which many important industries arise. Specimens of each product were shown, and the various methods of production were explained. The lecture was concluded by a reference to the production of alcohol from cellulose, and the possibilities of cellulose as a source of fuel for future use were examined.

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POLYMERISATION.—Highly-polymerised compounds. Parts III, IV and V. Poly-oxymethylenes. H. Standinger. *Helv. Chim. Acta*, February 2, 1925, pp. 41–70.

PHOTO-CHEMISTRY.—The reaction of ketones with alcohols under the influence of light. Part I. The absorption spectra of some ketones. S. L. Langedijk. *Rec. Trav. Chim. Pays-Bas*, February 15, 1925, pp. 173–191.

SUBSTITUTION.—The mechanism of substitution reactions in the aromatic nucleus. H. J. Prins. *Rec. Trav. Chim. Pays-Bas*, February 15, 1925, pp. 166–172.

COMPLEX COMPOUNDS.—Complex compounds of boric acid. Parts I and II. J. Meulenhoff. *Rec. Trav. Chim. Pays-Bas*, February 15, 1925, pp. 150–165.

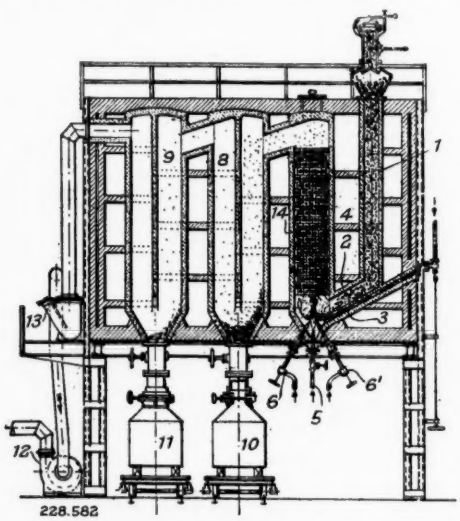
COMBUSTION.—The influence of some non-inflammable vapours of organic liquids on the limits of inflammability of mixtures of inflammable gases and air. Part III. W. P. Jorissen and J. C. Meuwissen. *Rec. Trav. Chim. Pays-Bas*, February 15, 1925, pp. 132–140.

Patent Literature

Abstracts of Complete Specifications

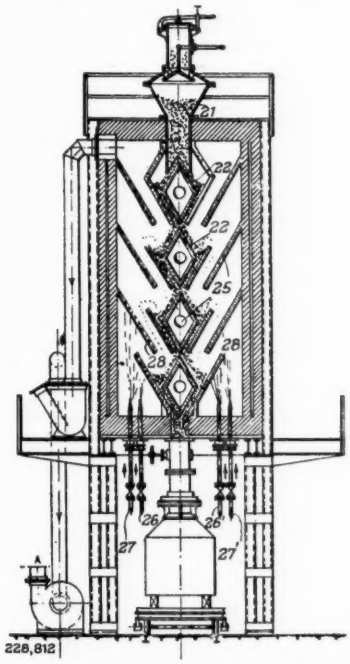
228,582 and 228,812. DECOLORISING CARBON, PROCESS FOR THE MANUFACTURE OF. H. E. Potts, Liverpool. From Naamlooze Vennootschap Algemeene Norit Maatschappij, 2, den Texstraat, Amsterdam. Application dates, August 9, 1923, February 22, and May 9, 1924.

228,582. In this process finely divided material is supplied to a heated space and maintained in a state of flotation by gas during activation. A product is obtained having an apparent specific gravity less than 0·1 and a real specific gravity not less than 2. The material to be activated is fed through a hopper 1 in which it is preheated or predistilled. The material then passes through a passage 2 at a rate controlled by the injector 3, to the activating chamber 4. Superheated steam for activating is injected through the pipe 5, and a combustible gas mixture through pipes 6, 6[1] for the internal heating of the retort. The material is suspended in the retort 4 by means of the steam jet for a time sufficient for the activation, *e.g.*, one minute, and the activated carbon is carried away with the gas. The carbon is separated in chambers 8, 9, and drawn off into containers 10, 11, while the gases pass on to a dust collector 13 and exhauster 12. To secure a



good heat transmission from the combustion gases to the material in the chamber 4, baffle rods 14 may be provided to mix the carbon with the gases. The lighter and more highly activated carbon only is carried into the chamber 8. Instead of using internal heating, the rods 14 may be replaced by internally heated pipes. The material employed should be finely divided, *e.g.*, 2–5 mm. size. It is preferably of high density when used for making carbon for gas adsorption, and of lower density when used for making carbon for treating liquids. The active carbon obtained by this process has a higher carbon content (98–99 per cent.), and a lower apparent specific gravity (0·06–0·1) and a higher real specific gravity (2·0–2·2) in comparison with activated carbon previously obtained. The activity is exceptionally high (50 per cent. above standard Norit). This carbon is also very refractory against chemical reaction, and is almost unaffected by boiling with concentrated sulphuric acid and potassium sulphate, fusing with potassium hydroxide or sulphur, etc. The carbon is particularly suitable for the purification of sugar solutions, and the decolorisation of oils, fats, etc.

228,812. This is an alternative method of heating the raw material for the manufacture of activated carbon. The material is fed from a hopper 21 on to the uppermost of a series of superposed rhomboids 22. The material is caused to pass downwards in contact with the surfaces of the rhomboids by means of plates parallel to the under surfaces of the rhomboids as shown. Each rhomboid is heated by an internal pipe or flue 25, so that the material is heated by radiation. The activating gas is introduced through nozzles 26, 26[1], and the combustible gas mixture for heating the activating chamber is introduced through nozzles 27, 27[1]. The hot gases are



deflected into contact with the material by means of plates 28. The product obtained is similar in character to that obtained according to Specification No. 228,582 above.

228,588. HYPOCHLORITE COMPOSITIONS. P. C. Rushen, London. From The Mathieson Alkali Works, Inc., 25, West 43rd Street, Manhattan, New York. Application date, October 1, 1923.

This composition comprises a mixture of solid stable calcium hypochlorite containing free alkali and sodium carbonate in reacting proportions, so that when added to water, a solution of sodium hypochlorite is obtained with precipitation of calcium carbonate. This composition is more stable than bleaching powder, and does not decompose on storage. The stable calcium hypochlorite is produced as described in Specification No. 195,366 (see THE CHEMICAL AGE, Vol. VIII, p. 599). The composition may be made into tablets or capsules, each of which may be used to give a solution of a definite strength when dissolved in water.

228,633. SULPHURIC ANHYDRIDE, PROCESS FOR THE PREPARATION OF—BY CONTACT USING VANADIUM SALTS. P. Audianne and G. Bachalard, 117, Boulevard Haussmann, Paris. Application date, November 8, 1923.

In this contact process a yield of sulphuric anhydride is obtained which is comparable to that obtained by the platinum process. The catalyst consists of grains of a porous material such as pumice or Kieselguhr impregnated with a solution of a vanadium salt, and dried. The grains are arranged in layers and are of decreasing size in each layer, varying from 5 mm. to 2 mm. The gases pass first through the layer containing the largest grains, and finally through the smallest grains. The gases are preferably first passed over a layer of platinum catalyst before reaching the layers of vanadium catalyst. Improved results can be obtained by adding 2–3 per cent. of iron, tungsten, or molybdenum oxides.

228,646. CONDENSING THE ACID FUMES EVOLVED DURING THE CONCENTRATION OF SULPHURIC ACID, PROCESS FOR. Chance and Hunt, Ltd., Oldbury, and W. A. S. Calder, Ravensthorpe, Harborne, Birmingham. Application date, November 10, 1923.

Specification No. 206,229 (see THE CHEMICAL AGE, Vol. IX,

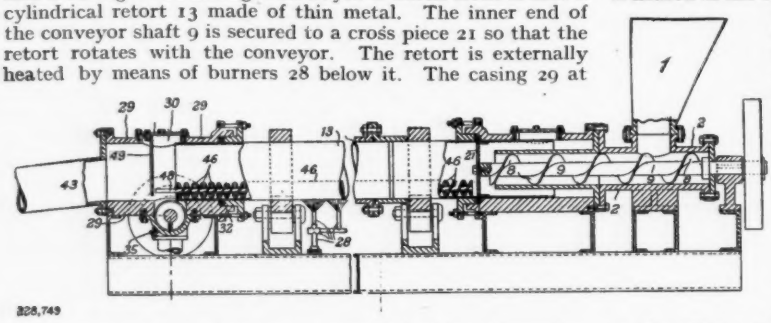
p. 637) describes a process for condensing sulphuric acid fumes by passing the gases, after adding moisture, through a constriction in a pipe. In this invention, the gases containing acid fumes are given the necessary velocity and moisture content by steam before their passage through the constriction. The concentration of the sulphuric acid condensed is not appreciably affected, as the steam does not condense at the temperature in the scrubber.

228,741. PRECIPITATION OF TRICALCIUM SACCHARATE, PROCESS AND APPARATUS FOR. C. Steffen, Jun., Taborstrasse 75, Vienna. Application date, April 1, 1924.

This process is for precipitating tricalcium saccharate from dilute sugar solutions (5–6 per cent.) by adding pulverised burnt lime. It has been found that when the pulverised lime is distributed on the liquid surface, the latter should be free from scum to prevent the partial hydration of the lime and delay in the formation of the saccharate. In this invention, the sugar solution is circulated from a collecting vessel to a cooler through a pipe connecting the lower ends, in which a pump is inserted. The upper ends of the two vessels are also connected by a pipe containing a regulating valve, which is so adjusted that liquid passes through it from one vessel to the other at the same rate that the liquid is drawn through the pump. In this manner a continually changing surface without scum is obtained in the cooling container, and the lime is distributed upon it from a superposed hopper.

228,749. DISTILLING CARBONACEOUS MATERIALS, APPARATUS FOR. C. A. Griffiths, Exploration Buildings, Commissioner Street, Johannesburg. Application date, April 15, 1924.

The apparatus is for extracting oils, paraffins, motor spirit, pitch, bitumen, ammonium sulphate, and other products from oil shales, torbanites, bituminous coal, wood, shavings, sawdust, etc. The pulverised material is fed from a hopper 1 into a casing 2 containing a conveyor 8 which feeds it into a cylindrical retort 13 made of thin metal. The inner end of the conveyor shaft 9 is secured to a cross piece 21 so that the retort rotates with the conveyor. The retort is externally heated by means of burners 28 below it. The casing 29 at



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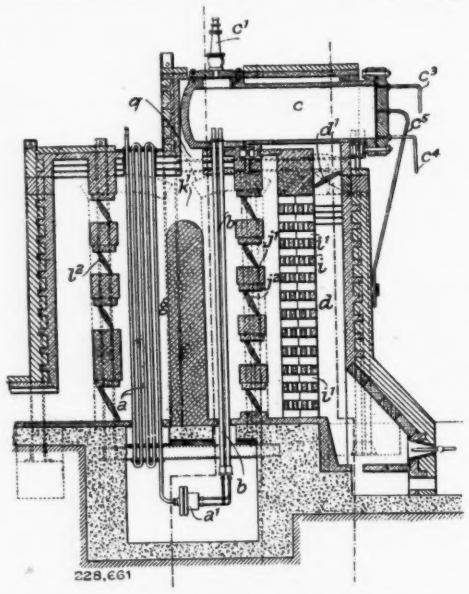
the discharge end of the retort is provided with an inspection opening 30 and with a stuffing box 32 forming a gas-tight joint with the retort. The residue from the retort is discharged into a trough 35, from which it is removed by a screw conveyor. The volatile products are drawn off through the pipe 43. The walls of the retort are kept free from deposits, and the material is distributed within it by means of a helical wire brush 46 which is prevented from moving longitudinally by means of a stop 49 and cross piece 21. Various substitutes for the brush 46 are described, the central rod 48 carrying discs, loose chains, etc.

228,661. TREATMENT OF LIQUID HYDROCARBONS, APPARATUS FOR. S. J. M. Auld, 23, Great Winchester Street, London, E.C.2., A. E. Dunstan, and P. H. Herring, Meadhurst, Cadbury Road, Sunbury-on-Thames. Application date, November 29, 1923.

The apparatus is for treating oil by a pressure cracking process such as that described in Specification No. 220,664 (see THE CHEMICAL AGE, Vol. XI, p. 329). A preheater *a* formed of a continuous tube one inch in diameter is connected at its lower end to a vessel a^1, and the separate cracking tubes *b* which may be one and a half inches in diameter are also connected to the vessel a^1. The upper ends of the tubes *b* project into a reaction vessel *c* provided with a safety valve c^1. Vapour may be drawn off from this vessel through a pipe c^3, liquid by a pipe c^5, and accumulations of carbonaceous matter by a pipe c^4. The heating gases pass upwards through the flue *d* controlled by a damper d^1, and then around the vessel *c*. The gases then pass downwards through the passages *q*, k^1, into the vertical flue *g* containing the preheater *a*. The vessel *c* may be heat-insulated at the bottom to avoid coking of the



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oil. Some of the hot gases pass through the passage i^1 in the wall *i*, at a rate regulated by the dampers j^1, to heat the tubes *b*. A similar set of dampers l^2 is provided at the outlet. The oil is heated in the tubes *b* to a temperature substantially beyond the cracking point in the vessel *c*. About 10–15 per cent. of gasoline having an end boiling point of 175° C. may be obtained by maintaining a pressure of 350–450 lb. per square inch, at which pressure most of the gas and vapour remains dissolved in the oil.

228,747. EVAPORATING THE VOLATILE CONSTITUENTS OF SOLUTIONS, EMULSIONS, AND SUSPENSIONS, APPARATUS FOR. F. Wreesmann, Steinsdorfstrasse 21, Munich, Bavaria. Application date, April 14, 1924.

This apparatus involves the principle of the atomisation of the solution or emulsion in an enclosed space where it is subjected to the effect of a gaseous desiccating agent. The liquid is atomised horizontally by a centrifugal device from a central point in an evaporating chamber. Part of the desiccating or drying gas is passed upwards into contact with the atomised liquid, and part is projected horizontally close to the atomised liquid above and/or below it. An apparatus for carrying out this method is described.

228,771. OXIDATION OF AROMATIC HYDROCARBONS. E. B. Maxted and B. E. Coke, Manor Road, Penn, Wolverhampton. Application date, June 4, and June 19, 1924.

This process is for the partial oxidation of polynuclear hydrocarbons, such as naphthalene, anthracene, or phenanthrene, or of mononuclear hydrocarbons such as benzene or its derivatives, by means of air in the presence of a catalyst. It has been found that the vanadates of tin and bismuth are particularly active as catalysts. Naphthalene may thus be converted into phthalic acid and/or its anhydride, anthracene to anthraquinone, benzene to maleic acid, and toluene to benzaldehyde and/or benzoic acid. This last reaction may be controlled so that benzoic acid becomes the principal product, by passing toluene vapour with excess of air over vanadate of tin heated to 260°–310° C. Examples are given in which (1) naphthalene vapour is oxidised to phthalic acid by tin vanadate heated to 260°–310° C. (2) Naphthalene vapour is oxidised to phthalic acid by means of bismuth vanadate heated to 300–450° C. (3) Anthracene vapour is oxidised to anthraquinone by means of bismuth vanadate heated to 300°–450° C. (4) Toluene vapour is oxidised to benzoic

acid by means of tin vanadate heated to 290° C. (5) Benzene vapour is oxidised to maleic acid by means of tin vanadate heated to 290° C.

228,814. TREATMENT OF SOLUTIONS FOR THE SEPARATION OF SUSPENDED MATTER. C. Weismann and J. Blumenfeld, 16, Addison Crescent, London, W.14. Application date, August 3, 1923.

Some solutions containing colloidal suspended matter—*e.g.*, some compounds of thorium, tin, zirconium, titanium, cannot be filtered, and the object is to clarify these solutions so that they may be readily separated by decantation or filtration. This is effected by adding a small proportion of an organic colloid having an electric charge of opposite sign to that of the original solution. Suitable colloids are casein, albumen, and gum—*e.g.*, a solution of thorium hydroxide in hydrochloric acid may be separated by adding albumen solution in the proportion of 1 in 10,000.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open for inspection under the International Convention: 206,836 (Electro Metallurgical Co.), relating to manufacture of rustless iron, etc., see Vol. X, p. 14 (Metallurgical Section); 220,655 (Synthetic Ammonia and Nitrates), relating to treatment of gases containing synthetic ammonia, see Vol. XI, p. 429.

International Specifications not yet Accepted

227,429. WATER SOFTENING. F. Schmidt, 47, Rossweinerstrasse, Döbeln, Saxony. International Convention date, January 12, 1924.

A water-softening composition consists of a mixture of caustic alkali, alkali carbonates and borates, and alkaline salts of acids insoluble in water which dissociate to a high degree in water—*e.g.*, silicates, aluminates, and aluminosilicates. The mixture may be made into a paste with clay or casein.

227,440. DYES. Fabrique de Produits Chimiques, Ci-devant Sandoz, Basle, Switzerland. International Convention date, January 11, 1924.

A diazo compound of the benzene or naphthalene series is coupled with a second component, rediazotized and coupled again with a second component, and finally diazotized and coupled with a 1-arylamino-naphthalene sulphonic acid to obtain trisazo dyes which give fast grey, blue-grey, or black shades on cotton. 1-phenylamino-naphthalene-8-sulphonic acid, or Cleve's 1-phenylamino-naphthalene sulphonic acid is coupled with the diazo compounds of the amino-disazo dyes:—α-naphthylamine or Cleve's acid or *p*-amino-acetanilide → Cleve's acid → Cleve's acid, 1-methyl-2-aminobenzene-4-sulphonic acid or *p*-toluidine → Cleve's acid → Cleve's acid, 1-methyl-2-aminobenzene-4-sulphonic acid → α-naphthylamine → Cleve's acid, Cleve's acid → Cleve's acid → α-naphthylamine.

227,447. PHOSPHATE MANURES. Chemiczny Instytut Badawczy, 3, Leona Sapiehy, Lemberg, Poland. International Convention date, January 7, 1924.

A soluble phosphate may be obtained by burning powdered coal and ground mineral phosphate in a furnace. If gypsum is added also, the solubility is increased. Potassium chloride may be added to obtain a potash and phosphate fertiliser.

LATEST NOTIFICATIONS

230,022. Process of producing combined shades on the vegetable fibre. Chemische Fabrik Griesheim-Elektron. February 25, 1924.

230,025. Process for the production of artificial horn. Schmidt, Dr. F. February 27, 1924.

230,029. Process of dyeing with ice-colours. Chemische Fabrik Griesheim-Elektron. February 25, 1924.

230,045. Process for separating compounds of potassim from compounds of aluminium. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. February 27, 1924.

230,055. Manufacture and production of new azo dyes. Farbenfabriken vorm. F. Bayer and Co. February 28, 1924.

230,063. Manufacture of acetic anhydride. Consortium für Elektro-Chemische Industrie Ges. February 25, 1924.

230,082. Manufacture of new acridine compounds. Chemische Fabrik auf. Actien vorm. E. Schering. February 29, 1924.

230,092. Process for manufacturing nitrated cellulose from wood-pulp, and apparatus therefor. Planchon, V. February 29, 1924.

230,106. Method for the extraction of carbon monoxide from industrial gases. Damiens, A. A. L. J. March 3, 1924.

Specifications Accepted with Date of Application

207,823. Electric furnaces. British Thomson-Houston Co. December 1, 1922.

208,710. Electrolytic cells for refining metals. Aluminum Co. of America. December 21, 1922.

209,423. Camphene and iso-bornyl-esters, Process for the production of a mixture of. Industrial Reseinera Ruth Soc. Anon. January 5, 1923.

211,845. Nitric acid, Manufacture of. Farbenfabriken vorm. F. Bayer and Co. February 26, 1923.

215,373. Acetate silk, Process for dyeing. Farbenfabriken vorm. F. Bayer and Co. May 1, 1923.

215,737. Vanadium, Method of extracting. A. Wittig. May 7, 1923.

216,120. Dipropylketone, Process for the manufacture of. Soc. Lefranc et Cie. May 17, 1923.

225,494. Electrolytic cells for electrolytic refining, Methods of operating and lining. Aluminum Co. of America. November 30, 1923.

229,399. Water gas, Apparatus for use in the manufacture of—and other cyclical processes. Humphreys and Glasgow, Ltd., and J. C. Stelfox. November 22, 1923.

229,491. Rubber, Vulcanisation of. Peachey Process Co., Ltd., and S. J. Peachey. February 23, 1924. Addition to 190,051.

229,527. China Clay and other argillaceous materials, Apparatus for drying. C. A. Battiscombe. April 22 1924.

229,560. Gasification of powdered fuel, Method of. H. M. Klotzer. July 9, 1924.

208,691. Tars, Process for the distillation of. Rutgerswerke Akt.-Ges. and L. Kahl. December 20, 1922.

229,359. Tin from ores or other tin-bearing materials, Process for extracting or recovering. T. Rondelli. August 24, 1923.

229,354. Synthesis of ammonia or similar gaseous reactions or operations, Construction of catalyst furnaces for use in. H. C. Greenwood and W. R. Tate. May 23, 1918.

229,608. Ores and the like, Method of treating. J. E. Greenawalt. November 5, 1924.

Applications for Patents

Allgemeine Ges. für Chemische Industrie and Marks, E. C. R. Separation of natural fats and oils into glycerides of acids. 5,981. March 4.

Baddiley, J., British Dyestuffs Corporation, Ltd., and Shepherdson, A. Manufacture of dyestuffs. 6,087. March 5.

Cassella and Co. Ges., L. Manufacture of pharmaceutical products. 6,305. March 7. (Germany, March 10, 1924.)

Chemische Fabrik Griesheim-Elektron. Process for drying calcium-hypochlorite compounds. 6,146. March 6. (Germany, April 15, 1924.)

Compagnie de Produits Chimiques et Electro-métallurgiques Alais, Froges, et Camargue. Heat-exchange apparatus. 6,155. March 6. (France, April 1, 1924.)

Compagnie de Produits Chimiques et Electro-métallurgiques Alais, Froges, et Camargue. Manufacture of hydrogen. 6,156. March 6. (France, April 11, 1924.)

Compagnie de Produits Chimiques et Electro-métallurgiques Alais, Froges, et Camargue. Preparation of a mixture of nitrogen and hydrogen. 6,157. March 6. (France, April 14, 1924.)

Consortium für Elektrochemische Industrie Ges. Manufacture of vinyl esters or ethers. 5,721. March 2. (Germany, April 1, 1924.)

Damiens, A. A. L. J. Extraction of carbon monoxide from gases. 5,698. March 2. (France, March 3, 1924.)

Farbenfabriken vorm. F. Bayer and Co. Manufacture of ω-amino-alkyl- substituted aminonaphthalene sulphonic acids. 5,915. March 4. (Germany, March 4, 1924.)

Forster, R. B., and Keyworth, C. M. Method of separating naphthalene sulphonic acids, etc. 6,232. March 7.

Niccoli, E. Production of potassium salts. 6,206. March 6.

Potts, H. E., and Zeche M. Stinnes. Separation of low-temperature tar into phenols and hydrocarbons. 6,246. March 7.

Ridgway, A. E. Heating of tars, bitumens, etc. 6,074. March 5.

Rigby, T. Separating solids from liquids. 6,124. March 6.

Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 5,722. March 2. (Switzerland, March 28, 1924.)

Soc. of Chemical Industry in Basle. Production of shades on acetyl cellulose. 6,302. March 7. (Switzerland, March 31, 1924.)

Suida, H. Recovery of concentrated acetic acid from dilute acetic acid. 5,685. March 2. (Austria, March 8, 1924.)

Sun Oil Co. Processes of mineral oil distillation. 6,318. March 7. (United States, March 17, 1924.)

Sweeney, O. R. Base-exchange water softener. 6,319. March 7.

Weber, I. E. Treatment of barium peroxide for obtaining hydrogen peroxide. 5,657. March 2.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, March 13, 1925.

THERE has been a little more activity during the past week, although the business is still on the quiet side. Prices, however, are very steady. There is little of interest in the immediate export situation.

General Chemicals

ACETONE.—Price is lower at £73 per ton, ex wharf London.

ACID ACETIC.—The uptake has improved to a certain extent, although it is still far below normal. Price is lower at £40 per ton for technical 80%, with pure unchanged at £42 to £43 per ton.

ACID CITRIC.—A little more inquiry. Price unchanged at 1s. 5d. to 1s. 5½d. per lb.

ACID FORMIC is in fair demand. There is no change in the price, 85% technical quality being quoted at £51 to £52 per ton.

ACID LACTIC is without special feature, 50% by weight commanding about £43 per ton.

ACID OXALIC is a firm market; price for the moment unchanged at 3¾d. per lb.

ACID TARTARIC.—Buyers are beginning to take a greater interest in this article, and as the season advances we are likely to see higher prices. The market at the moment is nominal.

ALUMINA SULPHATE.—The severe competition between the makers continues. It is difficult to fix the market price, and special inquiries should be made.

ARSENIC.—There is a complete absence of business, and price is sagging badly. Foreign can be bought at about £30 per ton, and the English makers are meeting the foreign prices where necessary.

BARIUM CHLORIDE is a quiet market; price unchanged.

CREAM OF TARTAR is in very much better demand. Price seems likely to go higher. £76 per ton is quoted to-day, ex wharf.

EPSOM SALTS is unchanged.

FORMALDEHYDE is in fair demand at £43 per ton, ex wharf.

LEAD ACETATE is an active market at £46 to £47 per ton for white and £44 for brown.

LEAD NITRATE is unchanged.

LIME ACETATE is inquired for at recent levels.

LITHOPONE is a brisk market, the price being £19 to £20 per ton.

METHYL ALCOHOL is in good demand. Price £50 per ton, ex wharf.

POTASSIUM PRUSSIATE is very firm at 8d. per lb.

SODIUM ACETATE is very quiet, and re-sale parcels have disturbed the market for the moment. Price is £21 per ton, ex wharf.

SODIUM HYPOSULPHITE is unchanged.

SODIUM PRUSSIATE is unchanged.

Coal Tar Products

The general tone of the market from last week is unchanged.

90% BENZOL is easier, and its value to-day is 1s. 9d. per gallon on rails.

PURE BENZOL is worth about 2s. per gallon on rails.

CREOSOTE OIL is a shade firmer than last week, and the downward tendency in price appears to have stopped. Its value is 6½d. per gallon on rails in the North, while the price in London is from 7¼d. to 7¾d. per gallon.

CRESYLIC ACID is fairly easy at 1s. 10d. per gallon on rails in bulk for the pale quality 97/99%, while the dark quality 95/97% is valued at 1s. 7d. to 1s. 8d. per gallon.

SOLVENT NAPHTHA is firm at 1s. 4d. per gallon on rails.

HEAVY NAPHTHA is unchanged at 1s. 1d. to 1s. 2d. per gallon on rails.

NAPHTHALENES are unchanged, the lower qualities being worth from £4 5s. to £4 15s. per ton. The higher quality 76/78 is quoted at £6 to £6 10s. per ton, and 74/76 quality is valued at £5 10s. to £6 per ton.

PITCH is slightly easier. To-day's values are 42s. 6d. to 45s. f.o.b. London and 40s. to 42s. 6d. f.o.b. East and West Coast ports.

Nitrogen Products Markets

Export.—During the last week the export demand has continued, and sales have been made at about the same price, £13 10s./£13 15s. f.o.b. per ton, for prompt delivery. There has been little interest in the market for forward delivery. As the wet weather has held back the home demand the producers have slightly more quantities available for export than was anticipated.

Home.—The Home demand is still less active than is usual for this time of the year. It is possible that the large Autumn and Winter demand has resulted in the falling off of purchases, but the weather obviously has an adverse effect on early Spring demand. The producers have reserved large quantities for home agricultural use, and it is anticipated that the bulk of these will be delivered for this purpose. The prices remain unchanged, and there is no prospect of alteration before the end of May.

Nitrate of Soda.—The Nitrate of Soda market continues unchanged, prices remaining at £11 15s./£11 18s. c.i.f., for prompt cargoes, for prompt shipment. Prices for March/April shipment are slightly in advance of this. It is anticipated that the European consumption will not absorb the stock already in Europe, and that the producers will have to carry over stocks to next season. The American consumption continues to be satisfactory.

American Market Movements

(From *Drug and Chemical Markets.*)

INDUSTRIAL chemicals register but little change and market generally quiet but firm. Barium chloride lower for shipment. Potassium chlorate higher. Carbon bisulphide easy. Intermediates quiet owing to small buying of dyestuffs in textile quarters. Demand for accelerators reported good. Ortho-nitrotoluene and ortho-toluidine higher. Crudes unchanged. Fine chemicals are in fair demand only. Alcohol has been cut by makers. Codliver oil firm for shipment. Imported citric and tartaric acids firm. Essential oil market is featured by firmness in the Messina essences. Oil peppermint advances again. Oil cedar wood in better supply.

German Chemical Market

(FROM A CORRESPONDENT.)

DEMAND has been satisfactory. Quotations for caustic potash and caustic soda were unchanged. There was a slight rise in price for chlorate of potash, as quantities on market were extremely scarce. Business was done on a basis of $11.50; chloride of calcium was somewhat lower in price, as works' quotations were higher than those of second hand and lots of 15 tons were quoted at £3 6s. Tartaric acid has risen in price and was quoted at $50. Whether customers are inclined to trade on this basis is not clear at present. There was some demand for glycerine and it was possible to sell lots in original packings at $34 per 100 kilos. Some orders for oxalic acid were on hand, but only for small quantities based on the present work quotations for lots of 10 tons. These orders could not be carried out. Some business was done in nitrite of soda, which was traded f.o.b. Hamburg at £21 in original casks. The price for chloride of barium will most probably rise as works are entirely sold out. Offers at about $3.95 were on market for crystallised products. Naphthalene in flakes and balls was sold in small quantities on a basis of about £13 12s., including packing. Orders for permanganate of potash could not be realised, as offers were made on a basis of £46 10s.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at retailers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£21 to £23 per ton.
Acid Boric, Commercial.—Crystal, £45 per ton, Powder, £47 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d. Normal business.
Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—2¾d. to 3d. per lb.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 to £18 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—2¾d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphate (Glauber Salts).—£3 12s 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—About £15 per ton d/d. Contract £14 15s. Carr. pd.
Sodium Sulphide Crystals.—£9 5s. per ton d/d. Contract £9 2s. 6d. Carr. pd.
Sodium Sulphide, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—5d. per lb. Quiet demand. Crude 60's, 1s. 5d. to 1s. 7d. per gall. Little demand.
Acid Cresylic 97/99.—1s. 8d. to 2s. per gall. Pale, 95%, 1s. 7d. to 1s. 10d. per gall. Dark, 1s. 7d. to 1s. 9d. per gall. Markets quiet.
Anthracene Paste 40%.—4d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7d. to 8d. per gall. Unstrained, 6d. to 7d. per gall.
Benzol.—Crude 65's.—9d. to 11½d. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 1s. 11d. per gall., ex works in tank wagons. Supplies very scarce.
Toluol,—90%, 1s. 7d. to 1s. 7½d. per gall. More inquiry. Pure, 1s. 11d. to 2s. per gall. Steady demand.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. to 9d. per gall. Better demand. Middle Oil, Heavy, Standard specification, 6d. to 7d. per gall., according to quality and district. Market firmer. Steady demand.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 3d. to 1s. 7d. per gall. Demand good. Solvent 90/190, 1s. 4d. to 1s. 6d. per gall. Demand good. Market very firm
Naphthalene Crude.—Demand rather better. Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Demand rather better. Whizzed or hot pressed, £6 to £9 per ton.
Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to districts.
Pitch.—Medium soft, 40s. to 45s. per ton, according to district. Not much business.
Pyridine.—90/160, 17s. 6d. to 18s. per gall. Market easier. Fair demand. Heavy, 11s. to 12s.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Business in dyestuffs has been very quiet since the beginning of the year, but there are now signs of improvement.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—3s. 9d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—11½d. to 1s. per lb. Price reduced. Improved demand.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—8d. per lb. naked at works.
Aniline Salts.—8d. per lb. naked at works
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s 8d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
p-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable
Dimethylaniline.—2s. 2d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
Monochlorbenzol.—£63 per ton.
a-Naphthol.—2s. 3d. per lb. d/d.
B-Naphthol.—1s. per lb. d/d.
a-Naphthylamine.—1s. 3½d. per lb. d/d.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—4s. 2d. per lb. d/d.
p-Nitraniline.—2s. 2d. per lb. d/d.
Nitrobenzene.—5½d. to 5¾d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d, per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 4d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Market depressed. Short hours in Lancashire cotton trade are a handicap to business in acetates.

Acetate of Lime.—Brown £11. Quiet market. Grey, £15 10s. per ton. Firmer. Liquor, 9d. per gall. 32° Tw.
Acetone —£78 per ton.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Fair demand.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 9d. per gall. Only moderate market. 60% O.P. Solvent 5s. per gall. 40% O.P.
Wood Tar.—£4 to £5 per ton. Demand slack and stocks being held.
Brown Sugar of Lead.—£43 10s. per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7¼d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Cadmium Sulphide.—4s. 4d. per lb., according to quantity.
Carbon Bisulphide.—£32 to £35 per ton, according to quantity.
Carbon Black.—6d. to 6½d. per lb., ex wharf.
Carbon Tetrachloride.—£62 to £67 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 4d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 7¼d. per lb.
Lamp Black.—£48 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.

Mineral Rubber "Rubpron."—£16 to £18 per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£56 to £65 per ton.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—5s 6d. per lb. Dearer.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£43 to £45 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 11d. to 3s. 1d. per lb., according to quantity. Sales steady. Price firm.
Acid, Benzoic B.P.—2s. to 2s. 6d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4½d. per lb., less 5% for ton lots. Raw materials dearer, equal to ½d. per lb on finished product.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots. Easier.
Acid, Pyrogallic, Crystals.—6s. per lb. for 1 cwt. lots. 7s. 6d. per lb. for 7-lb. lots according to quantity. Steady market.
Acid, Salicylic.—1s. 5d. to 1s. 6d. per lb., according to quantity. Steady market.
Acid, Tannic B.P.—2s. 9d. per lb. Quiet steady demand.
Acid, Tartaric.—1s. 1d. per lb., less 5%. Very firm. Demand good.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 9d. per lb. Price lower owing to competition.
Amidopyrin.—14s. per lb. Ample supplies.
Ammonium Benzoate.—3s. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—12s. 6d. per lb. Cheaper. Market less firm for Potash and Soda Salts.
Benzonaphthol.—4s. 3d. per lb. spot. Weaker. Demand quiet.
Bismuth Salts.—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
Bismuth Carbonate.—10s. 6d. to 12s. 6d. per lb.
Bismuth Citrate.—10s. 3d. to 12s. 3d. per lb.
Bismuth Salicylate.—9s to 11s. per lb.
Bismuth Subnitrate.—8s. 8d. to 10s. 8d. per lb. according to quantity.
(The price of Bismuth Metal has been raised from 5s. to 7s. 6d. per lb. Bismuth Salts have been advanced accordingly.)
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 6d. per lb.; sodium, 1s. 7d. per lb.; ammonium, 1s. 11d. per lb. Position easier with slight downward tendency.
Calcium Lactate.—1s. 7d. to 1s. 9d., according to quantity. Fair demand and steady market.
Chloral Hydrate.—3s. 10d. per lb., duty paid.
Chloroform.—2s. 6d. per lb. for cwt. lots.
Creosote Carbonate.—6s. 9d. per lb. Little demand.
Formaldehyde.—£42 10s. per ton, in barrels ex wharf London.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—7s. 10d. to 8s. per lb.
Hexamine.—2s. 9d. to 2s. 10d. per lb. For bold crystal. Powder slightly less
Homatropine Hydrobromide.—25s. to 30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon for makers' works, naked.
Hydroquinone.—4s. 3d. per lb. Nominal.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 11d. to 2s. 3d. per lb.
Magnesium Carbonate.—Light Commercial, £36 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £72 10s. per ton, less 2½%, price reduced; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 47s. 6d. per lb.; March delivery Firmer. Synthetic 26s. to 35s. per lb., according to quality.
Mercurials.—Market very quiet. Mercury slightly easier. Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb.
Methyl Salicylate.—1s. 7d. to 1s. 11d. per lb., according to quantity.
Methyl Sulphonal.—20s. per lb. Cheaper.
Metol.—11s. per lb. British make.
Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 2d. for B.P. quality. Keen competition has brought prices down.
Paraldehyde.—1s. 2d. to 1s. 6d. per lb., in free bottles and cases.
Phenacetin.—5s. per lb. in cwt. lots. Unsettled. Supplies exceed demand.
Phenazone.—6s. 3d. to 6s. 6d. per lb. Spot price lower than forward.
Phenolphthalein.—4s. 6d. to 5s. per lb. for cwt. lots.
Potassium Bitartrate 99/100% (Cream of Tartar).—86s. per cwt., less 2½% for ton lots. Raw material again dearer.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included. f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot; commercial, 8d. to 8½d. per lb., carriage paid. Slight reaction after recent advance.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—4s. 9d. per lb. In fair quantities. Supplies exceed demand.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. per lb., for cwt. lots. Slightly dearer.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb. From natural benzoic acid. Supplies of good quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hypophosphite, Photographic.—£13 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate. Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb. Strong demand, market firmer.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. per ton, minimum 5 ton lots, according to quantity; 1 cwt. kegs included.
Sulphonal.—13s. 6d. per lb. accepted for qantity.
Thymol.—18s. per lb. Firmer.

Perfumery Chemicals

Acetophenone.—11s. per lb.
Aubepine.—12s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 3d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 9d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 9d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—3s. 3d. per lb. Cheaper.
Cinnamic Aldehyde Natural.—16s. 6d. per lb.
Coumarin.—16s. 6d. per lb. Cheaper.
Citronellol.—22s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—12s. 6d. per lb
Ethyl Phthalate.—3s. per lb.
Eugenol.—10s. 6d. per lb.
Geraniol. (Palmarosa).—30s. per lb
Geraniol.—12s. 6d. to 20s. per lb.
Heliotropine.—6s. 9d. per lb.
Iso Eugenol.—15s. 3d. per lb.
Linalol ex Bois de Rose.—25s. per lb.
Linalyl Acetate.—25s. per lb.
Methyl Anthranilate.—10s. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—37s. 6d. per lb.
Musk Xylol.—11s. per lb.
Nerolin.—4s. 6d. per lb.
Phenyl Ethyl Acetate.—15s. 6d. per lb.
Phenyl Ethyl Alcohol.—14s. per lb. Cheaper.
Rhodinol.—37s. 6d. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. 2d. per lb.
Vanillin.—25s. to 25s. 6d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—13s. 9d. per lb.
Anise Oil.—2s. 6d. per lb.
Bergamot Oil.—16s. per lb.
Bourbon Geranium Oil.—24s. 6d. per lb.
Camphor Oil.—65s. per cwt.
Cananga Oil, Java.—11s. per lb.
Cinnamon Oil, Leaf.—6d. per oz.
Cassia Oil, 80/85%.—9s. per lb.
Citronella Oil.—Java, 85/90%, 5s. 6d. per lb. Cheaper. Ceylon, 3s. 2d. to 3s. 5d. per lb., according to quality.
Clove Oil.—7s. 9d. per lb.
Eucalyptus Oil, 70/75%.—2s. 1d. per lb.
Lavender Oil.—French 38/40% Esters, 35s. per lb.
Lemon Oil.—3s. 2d. per lb.
Lemongrass Oil.—5s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, March 12, 1925.

BUSINESS during the past week has been steady, though somewhat disappointing in volume, and prices both for home and continental products are on about the same level as last reported.

Industrial Chemicals

ACID ACETIC.—Quoted prices unchanged. 98/100% glacial £56 to £67 per ton according to quality and packing; 80% pure about £42 to £44 per ton; 80% technical, £41 to £43 per ton, packed in casks delivered c.i.f. U.K. ports, duty free. Some slightly cheaper parcels of technical quality 80% are offered from the continent at round about £40 per ton, but only limited quantities available.

ACID BORACIC.—Remains unchanged. Crystal or granulated, £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Spot material quoted 5¼d. per lb. delivered. Offered for forward delivery at slightly less.

ACID CITRIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5% ex store. On offer slightly cheaper for forward delivery.

ACID FORMIC 85%.—Spot material quoted £43 per ton, ex store. Offered for early delivery from the continent at about £49 per ton, c.i.f. U.K. port, duty paid.

ACID HYDROCHLORIC.—In little demand; price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—An indication of slightly higher prices from the continent. Spot lots still available at about 3¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Now quoted 11¾d. per lb., less 5%, ex store. Offered for prompt shipment at about the same figure.

ALUMINA SULPHATE, 17/18% IRON FREE.—Spot lots unchanged at about £7 5s. per ton, ex store. Offered from the continent for prompt shipment at about £6 12s. 6d. per ton, c.i.f. U.K. port.

ALUM.—Lump potash alum, unchanged at £9 10s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at £8 2s. 6d. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 6d. per lb., ex station. Containers extra and returnable, with possible slight reduction for large quantities.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks delivered U.K. port.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb. delivered, according to quantities. Containers extra.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at about £30 per ton, ex station, packed in casks. Bags £1 per ton less. Offered from the continent at about £25 10s. per ton, c.i.f. U.K. port. Fine white crystals offered from the continent at about £21 per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—Spot lots quoted £33 10s. per ton, ex store. Offered for early delivery at about £31 per ton, ex wharf. Foreign arsenic quoted £27 10s. per ton, c.i.f. U.K. port.

BARIUM CARBONATE. 98/100%.—Slightly dearer quotations from the continent. Now quoted £8 per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—English material now quoted £11 per ton, ex store. Offered from the continent at about £9 10s. per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots quoted £10 10s. per ton, ex station; contracts 20s. per ton less.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. port.

BORAX.—Unchanged. Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental further reduced to about £3 17s. 6d. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks, free.

COPPER SULPHATE.—British material quoted £24 10s. per ton, f.o.b. U.K. port. Continental available at about £24 per ton, ex store. Offered from the continent at about £23 to £24 per ton according to packages c.i.f. U.K. port.

FORMALDEHYDE, 40%.—Quotation remains unchanged at about £44 10s. per ton, ex store, but spot parcels could probably be obtained for less. Offered for prompt shipment from the continent at about £40 per ton, c.i.f. U.K. port.

GLAUBER SALTS.—White crystals of English manufacture quoted £4 per ton, ex store or station. Continental on offer at about £3 10s. per ton, c.i.f. U.K. port.

LEAD, RED.—Quoted £44 10s. per ton, ex store, but in little demand.

LEAD, WHITE.—On offer at £46 per ton, ex store.

LEAD, ACETATE.—Refined white crystals quoted £46 per ton, c.i.f. U.K. ports, prompt shipment from the continent. Spot lots on offer at about £47 per ton, ex store; dark brown quality quoted £39 10s. per ton, c.i.f. U.K. ports.

MAGNESITE, CALCINED.—Unchanged at about £7 17s. 6d. per ton, ex station, prompt delivery. Hard burnt quality quoted £4 15s. per ton, ex station. Finer quality of continental manufacture quoted £7 15s. per ton, c.i.f. U.K. port.

MAGNESIUM CHLORIDE.—Still cheaper quotations from the continent. Now on offer at about £3 15s. per ton, c.i.f. U.K. port.

POTASH, CAUSTIC 88/92%.—Unchanged at about £29 per ton, ex wharf, prompt shipment from the continent. Spot material available at about £30 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5d. per lb., delivered, for home consumption. Makers report reduction in price for export to some markets.

POTASSIUM CARBONATE, 96/98%.—Offered from the continent at about £24 per ton, c.i.f. U.K. ports. Spot material available at about £25 per ton, ex store.

POTASSIUM CHLORATE.—Offered from the continent at 3d. per lb., c.i.f. U.K. ports. Spot lots quoted 3¼d. per lb., ex store.

POTASSIUM NITRATE, SALTPETRE. — Refined granulated 99% on offer at about £25 per ton, c.i.f. U.K. port, prompt shipment from the continent. Spot material available at about £28 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot lots quoted 8½d. per lb., ex store. Offered at slightly less for forward delivery.

POTASSIUM PRUSSIATE, YELLOW.—Unchanged at about 7¾d. per lb., ex store, spot delivery. Offered for early delivery at slightly less, ex wharf.

SODA CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken 60%, £17 2s. 6d. per ton; powdered 98/99%. £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery, contracts 20s. per ton less.

SODIUM ACETATE.—Spot material now on offer at about £22 per ton, ex store. Offered for prompt shipment from the continent at about £20 per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £9 15s. per ton, ex station. Continental about £9 5s. per ton, ex store. Offered for forward delivery at about £8 5s. per ton, c.i.f. U.K. port. Pea crystals of English manufacture quoted £14 per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 17s. 6d. per ton, ex store. 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRITE.—100 %.—Spot material on offer at about £25 per ton, ex store. Offered from the continent at about £23 5s. per ton, c.i.f. U.K. port.

SODIUM PRUSSIATE, YELLOW.—In moderate demand and price unchanged at 4½d. per lb., ex store.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English manufacturers quote 60/62% solid £15 per ton, broken £1 per ton more; flake £2 per ton more; crystals 31/34% £9 5s. per ton, carriage paid U.K. stations, minimum 4-ton lots with slight reduction for contracts over a period. Continental material slightly cheaper. 60/62% solid offered at about £11 per ton, c.i.f. U.K. port; broken £12 per ton, c.i.f. U.K. port. 30/32% crystals £8 5s. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8s. 10s. per ton; rock, £8 7s. 6d. per ton; ground, £8 5s. per ton—ex store, prices nominal.

ZINC CHLORIDE 96/98%.—Continental manufacture quoted £23 per ton, c.i.f. U.K. port. English material for export on offer at about £25 to £26 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—Spot material now on offer at about £12 5s. per ton, ex store, but little demand.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

PARANITRANILINE.—Fair home business. Price 2s. 1d. per lb. for 5 cwts.

MONO METHYLAMINE BASE.—Good home inquiries. Price 14s. 10d. for 2 tons.

PHENYL GLYCINE.—Some home inquiries. Price 2s. 1d. per ton.

BETA NAPHTHOL.—Good home and export inquiries. Price 11d. per lb,

NAPHTHIONATE OF SODA.—Some home business. Price 2s. 3d. per lb. 100%.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, March 12, 1925.

As has been the case practically from the beginning of the year hand-to-mouth buying is still the outstanding feature of business on the Manchester chemical market. Buying for home consumption purposes is, of course, adversely affected by the reduced operations in the American section of the cotton textile industry. Other large industrial users are also working at reduced capacity. Trade on export account is of limited extent and is chiefly for the Dominions and the East, Continental countries taking very little.

Heavy Chemicals

There is only a very small demand for Glauber salts, which are still on offer at £3 10s. per ton. Saltcake, also, is attracting comparatively little attention, though the price is about unchanged from last week at £4 per ton. Hyposulphite of soda keeps fairly steady at £13 10s. to £13 15s. per ton for photographic crystals and round £9 10s. for commercial. Caustic soda is steady and in moderate request at from £15 12s. 6d. per ton for 60 per cent. material to £18 for 76-77 per cent. Soda crystals are in quietly steady demand and values are unchanged at £5 5s. per ton. Alkali is quoted at £6 15s. and a fair amount of business is being put through. Prussiate of soda keeps quiet and values have an easy tendency, the current quotation being round 4d. per lb. Acetate of soda is in limited demand at round £21 per ton. Bleaching powder is selling in comparatively small quantities at £9 10s. per ton. Bichromate of soda is maintained at last week's level of 4d. per lb. Phosphate of soda is dull and prices are easy at £12 10s. to £13 per ton. Sulphide of sodium is quiet at £13 15s. to £14 per ton for 60-65 per cent. concentrated solid and round £9 10s. per ton for crystals. The demand for chlorate of soda is still rather subdued, though prices are fairly steady at 2⅞d. per lb. Bicarbonate of soda is only moderately active, but at £10 10s. per ton values are not quotably changed from the level of recent weeks.

Among potash compounds caustic potash is rather inactive; current value for 90 per cent. strength is now round about £30. Carbonate of potash is steady at £23 10s. to £24 per ton. Bichromate of potash is unchanged at 5d. per lb., and a fair inquiry is being met with. Prussiate of potash is still in small demand, but the value is maintained at 7½d. per lb. Chlorate of potash is currently quoted at 2⅞d. per lb.; buying interest in this material is quiet. Permanganate of potash is fairly steady at 6¾d. to 8d. per lb., according to quality.

Sulphate of copper is said to be a shade more active than it has been but values show little change, an average to-day being £24 15s. per ton f.o.b. Arsenic is still very much in the doldrums and prices continue weak; white powdered, Cornish makes, is now about £33 per ton in Manchester. Commercial Epsom salts are in moderate request at £4 15s. per ton; magnesium sulphate, B.P. quality, is quoted at about £6 5s. Acetate of lime is fairly steady, though in small demand at £15 10s. per ton for grey material and £10 10s. for brown. White acetate of lead continues to offer at £46 10s. to £47 per ton and brown at £43; only a limited amount of business is being done. Nitrate of lead is maintained at £41 to £42 per ton.

Acids and Tar Products

Tartaric acid is quiet and prices have an easier tendency; to-day's value is 1s. to 1s. 0½d. per lb., with citric acid steady at 1s. 4½d. per lb. Oxalic acid continues to attract little attention and prices remain easy at round 3½d. per lb. Acetic acid is rather quiet at about £40 per ton for 80 per cent. commercial quality and £67 for glacial.

Carbolic acid remains a very dull section and quotations are more or less nominal; crystals are offering at 5½d. to 5¾d. per lb., and crude carbolic at about 1s. 8d. per gallon. Pitch is inactive and values are easy; 42s. 6d. per ton is probably an average quotation. Solvent naphtha is rather quiet at 1s. 5½d. per gallon. Creosote oil is only in moderate request at about 6¾d. per gallon. Naphthalenes are in small demand, and prices vary from £15 to £15 10s. per ton for refined to £5 for the lowest grade of crude.

Barter Trading Corporation's Annual Review

THE annual market report, issued by the Barter Trading Corporation, Ltd., Imperial House, Kingsway, London, deals with the trade in industrial chemicals, variations in market conditions, and highest and lowest prices during 1924. In forecasting conditions, it says:—

"The establishment of a stable Government in this country has undoubtedly inspired confidence and the expectation of increased trade. Further, confidence has also been engendered by the international efforts to bring about a state of financial stability in Europe, and also by a reduction in the fluctuations in exchanges. The American elections have already had their effect, and that country is now, in many directions, experiencing increasing commercial activity. The Stock Exchange appreciation in quotations of nearly all classes of industrial securities in Great Britain and in America has been substantial but, for a permanent expansion of business something more solid than Stock Exchange speculation is required. There have been since the war several recrudescences of optimism, but such increased business as resulted was short-lived. While opinions are even now not unanimous, it is more generally anticipated that the evidence of increasing confidence may be accepted as being founded on surer grounds than mere sentiment. Nevertheless, a steady, gradual recovery all round to normal conditions is to be preferred to a large increase in the volume of trade followed by a reaction. Surplus plant capacity the world over is awaiting employment. The employment of this additional capacity should check abnormal increases in prices and should make for reductions in costs when markets can absorb the full output.

Dyers' Unemployment Pay Ruling

ANOTHER important decision relating to the application of the Unemployment Insurance Act to operative dyers on short time was received in Bradford on Monday by the Amalgamated Society of Dyers from Mr. J. G. Pease, the umpire under the Act.

In view of the umpire having expressed an opinion that an operative who has worked four shifts of twelve hours each is not unemployed in any part of the week, Mr. W. Rushworth, Secretary of the Amalgamated Society of Dyers, decided to put a second case before Mr. Pease.

Mr. Pease, in his award, says: "Decision 8533 in terms applies only to men whose normal week's work is four shifts of twelve hours' continuous work in each shift, but that decision and No. 130–25 are applicable also to men who normally work in a week four shifts of twelve hours each with intervals for meals, reducing the hours of actual work to eleven hours in each shift, or 44 hours in the week."

Dyestuffs Licences for February

THE following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during February has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee:—

The total number of applications received during the month was 459, of which 383 were from merchants or importers. To these should be added 13 cases outstanding on February 2, making a total for the month of 472. These were dealt with as follows: Granted, 319 (of which 301 were dealt with within seven days of receipt). Referred to British makers of similar products, 90 (of which 74 were dealt with within seven days of receipt). Referred to Reparation Supplies available, 35 (all dealt with within two days of receipt). Outstanding on February 28, 1925, 28. Of the total of 472 applications received, 401, or 87 per cent., were dealt with within seven days of receipt.

Company News

ASBESTOS CORPORATION OF CANADA.—A dividend of 1½ per cent. on the preferred stock for the quarter ended March 31 is payable on April 15.

AMERICAN CYANAMID CO.—A dividend of $1½ per share on the preferred stock and $1 per share, plus $½ extra on the common stock is announced, payable on April 1.

SALT UNION.—The directors announce a dividend of 2s. 6d. per share, which compares with 2s. for the previous year. A sum of £50,000 is again placed to general reserve and £66,509 is carried forward, against £36,735 brought in.

SIAMESE TIN SYNDICATE, LTD.—The directors have declared an interim dividend of 10 per cent. (2s. per share), less tax, in respect of the current year, payable on March 31 to shareholders registered in the books of the company on March 16.

R. R. MINTON AND CO.—The following dividends have been declared for the year ending December 31 last: 5½ per cent. on the cumulative preference shares, less tax; 7 per cent. on the preferred shares, less tax; and 12½ per cent. on the ordinary shares, free of tax.

LOCKE, BLACKETT AND CO.—The accounts for the year 1924 show a profit of £13,959, plus £2,786 brought forward. The directors propose placing £2,000 to depreciation of plant; a dividend of 2s. per share on the ordinary shares, less tax; placing to suspense account £406, and to reserve £3,500, carrying forward £2,799.

TARMAC, LTD.—The directors have decided, subject to completion of the audit of the company's books to recommend in their annual report to the shareholders a final dividend of 2s. per share, free of tax, on the ordinary shares, making, with the interim dividend paid on August 1, 1924, 3s. per share, free of tax for the year 1924.

BRITON FERRY CHEMICAL AND MANURE CO.—The report for the year 1924 states that after providing £269 for corporation tax, £7,748 for the second instalment of debenture redemption, charging £10,000 for depreciation, £4,455 for preference dividend, transferring £5,000 to plant renewal account, and £4,788 to reserve, there remains, including balance brought in, £11,258. The directors recommend payment on March 21 of dividend of 1s. per share, less tax, on the ordinary shares.

PINCHIN, JOHNSON AND CO., LTD.—The net trading profit for the year 1924, after providing for all expenses, etc., amounts to £125,142, plus profit on sale of property £2,114, making a total revenue of £127,256. The directors propose to pay a final dividend on the ordinary shares of 22 per cent. actual, making a total of 30 per cent. for the year (against 22½ per cent.), to place the sum of £25,000 to reserve (against £10,000), and to carry forward to 1925 the sum of £30,478 (against £23,139). The annual meeting will be held at General Buildings, Aldwych, London, on March 23 at 11.30 a.m.

Benn Brothers' Social Circle

MEMBERS of the staff of Benn Bros. Ltd., filled King George's Hall, Caroline Street, W.C., on Friday, February 27, to see an excellent presentation of A. A. Milne's comedy, "Mr. Pim Passes By." Members of the cast were: Anne, Josephine M. Delaney (*Cabinet Maker*); Carraway Pim, Henry W. Duck (*Gardening Illustrated*); Dinah, Kathleen Woollard (*Hardware Trade Journal*); Brian Strange, Leslie J. Moolenaar (*Cabinet Maker*); Olivia, Phyllis I. Trimby (THE CHEMICAL AGE); George Marden, J.P., Alec P. Anderson (*Export World*); Lady Marden, Eva Childs (*Cabinet Maker*). The producer, Mr. H. J. Wrench (THE CHEMICAL AGE) and the stage manager, Mr. A. J. Grieve (*Gardening Illustrated*) are to be congratulated on the performance. Those present included Sir Ernest and Lady Benn, Captain and Mrs. Wedgwood Benn, Mr. and Mrs. Henry Benn, Mr. and Mrs. F. H. Elliott, Mr. and Mrs. E. E. Starke, and Mr. and Mrs. B. Glanville. Sir Ernest Benn, in a brief speech, thanked the artistes and others who had contributed to the enjoyable evening.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

GLUE, GLASS PAPER, ETC.—A firm of manufacturers' agents in Cape Town desires to secure agencies for glass paper, glue and cognate lines for the whole of the Dominion. (Reference No. 256.)

CHEMICAL MANURES.—The Egyptian Ministry of Agriculture is calling for tenders for the supply of chemical manures. (Reference No. B.X. 1,606.)

OILS, PAINTS, WHITE LEAD.—Tenders invited for supplies of oils, paints, white lead, glass, disinfectants, refined tar, by Darlington Corporation. Tenders to Town Clerk, Houndgate. Darlington, by March 26.

TAR, CEMENT, ETC.—Tenders invited for supply of pitch, creosote oil, tar, Portland cement, lime and mortar, by Eccles Corporation. Tenders to Borough Surveyor by March 16.

OILS, GREASES, ETC.—Tenders invited for supply of oils, greases, explosives, tar macadam, for Middle Ward, County Lanark. Forms to Road Surveyor, Hamilton, by March 25.

OILS AND FATS.—A commission agent in Oslo desires to represent British mills producing cottonseed oil and other edible oils and fats for margarine and technical fats for soap making. (Reference No. 303.)

ARTIFICIAL SILK YARN.—A commission agent at Valparaiso wishes to represent British manufacturers of artificial silk yarn. (Reference No. 309.)

Glasgow Chemical Manufacturer's Affairs

A MEETING of the creditors of Robert Lockhart Swann, trading as G. D. L. Swann & Son, chemical manufacturers and general merchants, 129, West Graham Street, Glasgow, was held recently at Glasgow. It was reported that a trust deed has been executed in his favour. A statement of affairs was submitted, which showed the position as at February 17, and disclosed liabilities £1,068 12s. 9d., and assets £222 6s. 5d. The statement showed an apparent dividend of 3s. 8d. in the £, subject to the expenses of realisation.

The trustee stated that he had advertised the business for sale as a going concern, but had so far received no inquiries. He had, however, received intimation of an offer from another source of £250. The creditors were of opinion that the offer should be accepted. A committee was appointed, and it was stated that a dividend of 4s. to 4s. 6d. in the £ would probably be payable on the estate.

Obituary

Sir Thomas Ratcliffe Ratcliffe-Ellis, for thirty years clerk and secretary to the Mining Association of Great Britain, aged 82.

Mr. C. Hanson, aged 69, head of the firm of Charles Hanson and Sons, Ltd., soap manufacturers and oil merchants, Springbank Mills, Brighouse.

Mr. James Jarvis Rainey, aged 62, agricultural chemist, of Spilsby.

Mr. John Thomas, head of the laboratory at the Earl of Dudley's Round Oak Iron and Steel Works, Ltd. He was the first chemist employed by the firm, and had been associated with it for nearly thirty years. He was a member of the Council of the South Staffordshire Iron and Steel Institute and the Birmingham Metallurgical Society.

Mr. Robert Brown, chairman and managing director of Robert Brown and Sons, Ltd., fireclay manufacturers, of Ferguslie, Paisley. He was 57 years of age, and one of the best-known figures in the pottery trade.

Mr. William Gibson, for many years associated with the firm of Raine and Gibson, oil merchants, of Newcastle.

Charles Henry Leigh, deputy chairman of Groves and Whitnall, brewers and mineral water manufacturers, of Salford. He had been connected with the firm for over forty years.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry make no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ADCOCK, Robert Page, 41, Oakfield Street, Cardiff, manufacturing chemist. (C.C., 14/3/25.) £113 2s. 2d. January 14.

BOOTH, Thomas Arthur, Louisa Street, Idle, Bradford, wholesale druggist. (C.C., 14/3/25.) £43 0s. 8d. January 30.

Receivership

CAMBRIAN ELECTROLYTIC ZINC CO., LTD. (C.A., 14/3/25.) E. Wakefield, of 80, Bishopsgate, E.C.2, was appointed receiver on February 20, 1925, under powers contained in debentures dated July 18, August 31, October 16 and December 19, 1923. R. Kettle, of 5, London Wall Buildings, E.C.2, appointed receiver on September 23, 1924, ceased to act in that capacity on February 20, 1925.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

GRUNDY (R. E.) AND CO. (1924), LTD., Bowlee, manufacturing chemists. (M., 14/3/25.) Registered February 27, £1,500 debentures, to F. Rees, 92, Kirkhams, Bury Old Road, Prestwich, sec.; charged on Bowlee Mill, Middleton, also general charge.

PRODUCE AND CHEMICAL CO., LTD., London, E.C. (M., 14/3/25.) Registered February 28, £500 debentures, to R. H. St. C. Harrison, 11, Antrim Mansions, Belsize Park, N.W.; general charge. *£1,000. August 31, 1924.

TAYLOR'S DRUG CO., LTD., Leeds. (M., 14/3/25.) Registered March 2, £1,000 further charge, to Mrs. G. I. Speight, Highgate, Roundhay; charged on 163, Freeman Street, Grimsby. *£111,744 0s. 11d. September 12, 1924.

Satisfactions

EVANS, SONS, LESCHER AND WEBB, LTD., Liverpool, manufacturing chemists. (M.S., 14/3/25.) Satisfaction registered February 25, £29,000, part of amount registered December 4, 1902, and March 12, 1908, and 47, 52, 53, 54, 57, 58, 59 and 60, Bartholomew Close, E.C., released from the mortgage.

NEVILLE'S (PARIS), LTD., London, W., perfume manufacturers. (M.S., 14/3/25.) Satisfaction registered February 26, £1,000, registered December 7, 1920.

London Gazette, &c.

Company Winding Up Voluntarily

ELTON COP DYEING CO., LTD. (C.W.U.V., 14/3/25.) F. Murgatroyd, chartered accountant, Duchy Chambers, Clarence Street, Manchester, and Palatine Chambers, Silver Street, Bury, appointed liquidator, February 27.

New Companies Registered

R. F. MACDONALD AND CO. (CHEMICAL MANUFACTURERS), LTD. Chemical merchants and analysts. Nom. cap., £4,000 in £1 shares (2,000 preference and 2,000 ordinary). Solicitors: H. Mawson, 49, Hoghton Street, Southport.

SANTONIN AND WORMSEED UNIVERSAL CO., LTD. To carry on business in Santonin and Wormseed in all forms, finished, half-finished, or raw material and all manufactured products in which Santonin and Wormseed form any part; to deal in pharmaceutical or heavy chemicals and drugs, etc. Nom. cap., £200 in £1 shares. Solicitor: S. Landman, Sentinel House, Southampton Row, London, W.C.

SODAMATIC, LTD., 19, Waterloo Street, Birmingham. To acquire shares and interests in a certain patent for an invention relating to apparatus for aerating liquids, and to carry on the business of mechanical, electrical and hydraulic engineers, etc. Nom. cap., £1,050 in 1,000 7 per cent. cumulative participating preference shares of £1 each and 1,000 deferred ordinary shares of 1s. each.

New Chemical Trade Marks

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to April 11, 1925.

"OBLIT."

452,822. For a chemical substance for use in the manufacture of dyed cloths. Class 1. Oswald M'Cardell and Co., Stretford Chemical Works, Low Moss Lane, Barton Road, Stretford, Manchester, chemical manufacturers. October 18, 1924. (To be Associated. Section 24.) (By consent.)

"PERMANLITH."

453,198. For chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Class 1. Taylor Bros. and Cox, Ltd., 5, Mark Lane, London, E.C.3, manufacturers. October 31, 1924. (To be Associated. Section 24.)

"PERMLITH."

454,208. For chemical substances used in manufactures, photography, or philosophical research, and anti-corrosive. Taylor Bros. and Cox, Ltd., 5, Mark Lane, London, E.C.3, manufacturers. December 3, 1924. (To be Associated. Section 24.)

"GENOXIDE."

455,731. For chemical substances prepared for use in medicine and pharmacy. B. Laporte, Ltd., Kingsway, Luton, Bedfordshire, chemical manufacturers. January 27, 1925.

"TORFOL."

455,193. For raw, or partly prepared, vegetable, animal and mineral substances used in manufactures, not included in other classes. Class 4. Eduard Dyckerhoff, Poggenhagen, bei Neustadt am, Rubenberge, Hanover, Germany, manufacturer. January 9, 1925. (To be Associated. Section 24.)

Germany's Chemical Industry

AN official report from Berlin, published by the Department of Overseas Trade, reveals German conditions during February. The position in the chemical industry showed some improvement, though foreign sales were not all that could have been desired. In the chemical preparations industry also, sales improved, but did not revive to the extent formerly usual in February, when large laboratory orders were placed by the universities. The latter have little money at their disposal and are, therefore, not able to cover on a large scale their requirements in respect of laboratory chemicals. Sales of glass chemicals developed satisfactorily.

The potash industry was able to increase its January sales, amounting to 165,995 metric tons K_2O, to 190,000 metric tons. Thus the sale in the first two months of this year have exceeded the sales in the corresponding months of 1913. German agriculture was the principal participator in the February calls, owing to the favourable weather. Foreign sales were maintained at the former level. Employment in the oil industry was satisfactory. In consequence of keen foreign competition, prices continued unsatisfactory. Business again improved in the margarine industry.